AN HISTORICAL OVERVIEW OF REDWOOD LOGGING RESOURCES WITHIN THE HUME LAKE RANGER DISTRICT, SEQUOIA NATIONAL FOREST, CALIFORNIA

FINAL REPORT

by

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ABSTRACT

The historical overview presented here identifies and evaluates the available primary and secondary historical sources pertaining to redwood logging resources within the Hume Lake Ranger District of the Sequoia National Forest; it summarizes the region's settlement history; and it presents a three-phase chronology for the redwood logging operations that were carried out in this area from 1860 to the 1920s. Additionally, a site typology for the resources of each phase is presented, and the major research questions of relevance to scholars concerned with this region's historic logging resources are detailed in the form of a specific, problem-oriented research design. This research design further served as the framework for reviewing and evaluating the historic record available for this area and its historic logging resources. Through the analysis of the documentary record and the results of a brief field reconnaissance, the significance of these resources is defined using the principles of information loss and nomothetic potential. Management suggestions are offered for resource protection, data recovery, site maintenance, and interpretive strategies within the Hume Lake Ranger District. The development of a program to investigate historic redwood logging at the regional, state, and national levels is suggested as an ideal strategy for the management of these resources.

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Chapter 1

GENERAL INTRODUCTION

The Forest Service's obligation to "discover, manage, protect, and interpret cultural values which are qualified or may qualify for inclusion on the National Register of Historic Places" (36 CFR 219) applies equally to prehistoric and historic period resources. Although National Forests can contain a broad range of historical cultural materials of both an archaeological and an architectural nature (Beckham 1978), one of the most common categories of historical remains found on National Forest lands is that associated with early logging and lumbering activities. Such remains, which range from surface scatters of broken bottles and tin cans to large technological features and machinery, such as dams, railroad trestles, and steam donkeys, have proven especially troublesome to those Forest Service personnel, trained mainly in prehistoric archaeology, who are directly responsible for cultural resource management in particular Forests. These logging-related materials are often neither archaeological, in the traditional sense of being beneath the ground, nor architectural, in the conventional sense of aesthetically pleasing buildings. Furthermore, while historic logging has long been appreciated and studied by avocationalists, there are only a small number of professionally trained historians and other scholars who are fully familiar with this subject. The result is a need for documents such as this one -- an historical overview of logging within one National Forest District -- and for studies and an overall planning framework which place the numerous individual examples of historic logging operations into a

broader regional, and even national, context.

Many preliminary studies of historic logging have been produced in the last few years for National Forests in California and the rest of the country. Whether prepared by Forest archaeologists and their staffs or by historians and archaeologists under contract to individual Forests, most studies have focused on railroad logging technology, its material expression, and its evolution in specific areas. Because the subject is so new to those doing the research, too much emphasis has been placed on the accurate identification of the material components and by-products of early logging technologies and the social organization they created, at the expense of realistically appraising the broader research potential of what is left on the ground.

There are good programmatic statements available regarding the significance of logging remains (e.g., McDonald 1980), and other studies have been performed which clearly demonstrate the importance of reconstructing the economic and social history of logging (Shoup and Baker 1979). In addition, innovative analysis has been made of the overall environmental effects of early logging technology, as compared with that presently being employed (Wolfenden 1980). For all these suggestive preliminary efforts, however, the real value of most logging-related remains for the study of important technological, economic, and social aspects of this industry has not been firmly established.

In the absence of background knowledge and accurate survey data necessary for identifying and properly evaluating historic logging materials, as well as other historic-period remains within National Forests, these resources have often been ignored, destroyed, or carefully protected until they can be assessed by appropriate experts.

This latter strategy, while admirable in its caution, has often resulted in the unnecessary delay of timber sales and other projects because of a surface scatter of tin cans and bottles or a few broken bits of cable. In light of this situation, the overview which follows attempts to place logging remains in proper perspective by defining two basic principles for assessing their significance -- information loss and nomothetic potential (Hickman 1977; Brown 1979), and bearing in mind two other basic principles recently stated in the Advisory Council on Historic Preservation's handbook for the treatment of archaeological properties: (1) "not all research problems are equally important, hence not all archaeological properties are equally important," and (2) "treatment of an archaeological property depends on its value for research, balanced against other public values" (Advisory Council 1980:6-8).

Application of these principles to historic redwood logging remains situated within the Hume Lake Ranger District (Chapter 6) has required several types of background data provided by the historical overview. These data include a summary of the settlement history of the project area and surrounding region in terms of environmental context, major patterns of land use and resource exploitation, predominant economic activities, and participating social and cultural groups (Chapter 3); emphasis has been placed on the organization and spatial progression of logging activities in the project area during different time periods (Chapter 4). The types of primary and secondary historical sources pertaining to the logging industry in the Hume Lake Ranger District have been identified and evaluated to the extent permitted by this preliminary study (Chapter 2), and all of the

site types associated with historic logging activities that could be documented from available sources and a very brief field reconnaissance have been described (Chapter 6).

These overview data, in combination with available survey and other site-identification information, permit the definition of the relative representativeness or uniqueness of individual sites and features, i.e., the degree to which these resources exemplify important stages in the evolution of the redwood logging industry and associated economic and social organization within the Hume Lake Ranger District. Data provided by the overview may also be employed to estimate the potential for information loss, should certain categories of logging remains not be preserved or intensively studied. What appears to be the quantity and quality of historical documentation available for different kinds of logging remains during different time periods within the project area is compared with the research questions which have been formulated for the study of historic redwood logging. The potential contribution of excavated and other kinds of recorded archaeological data can thus be specified for different categories of remains, and data recovery and other management strategies can be established (Chapter 7)

An important caveat should be borne in mind when reviewing this report and applying the approach it recommends to assessing specific categories of redwood logging remains encountered during timber sales and other project-related surveys, as well as to the intensive survey of the redwood logging system recommended below. The funding limits of the procurement under which this report was prepared did not permit an exhaustive evaluation of historical documentation, nor collection of information which may be available through a thorough and systematic

program of oral history interviewing. Likewise, accurate knowledge of the precise location and present condition of various sites and features associated with logging operations during different periods could not be obtained in most cases because of the lack of existing reliable survey data and the inaccessibility of many known sites. Therefore, the most efficient use of the data and evaluative scheme contained in this overview will be to employ them in designing an intensive survey which has as its purpose the mapping and recording of the entire redwood logging system as it evolved within the Hume Lake Ranger District. As a preliminary step in this effort, the Sequoia National Forest should acquire copies of the most useful plats and maps and other documents with locational information in the collection of Jean Hume Browning at Michigan State University (see Appendix A) and Paul Spivey at the Bancroft Library, U.C. Berkeley (see Appendix B). Finally, the Forest should initiate an oral history program focusing on redwood logging in coordination with the intensive survey.

Chapter 2

METHODS AND SOURCES

Introduction

A contract entitled "Redwood Logging Research on the Hume Lake Ranger District" was awarded to the Sonoma State University Academic Foundation, Inc., by the U.S. Forest Service in October 1980, and research began immediately. Data collection and review for the overview was limited to less than five months of study.

Only minimal field reconnaissance was performed under this contract; the site typology, evaluation of significance, and management recommendations are therefore based almost exclusively on documentary and/or oral accounts. This chapter outlines the methods used in developing this overview and concludes with an evaluation of the documentary sources available.

Methods

The basic research strategy for this overview study was to collect data pertaining to the lumbering of the Sierra redwood (*Sequoiadendron giganteum*) through three lines of evidence: (1) information about this industry contained in accessible primary and secondary documentary records; (2) interviews with knowledgeable and concerned informants regarding the early logging industry in the project area; and (3) a very brief field inspection of known sites and features created by this industry.

The first task under this contract was to develop a research design for the historic remains of redwood logging activities which occurred

within the Hume Lake Ranger District during the latter part of the eighteenth century and the early part of the nineteenth century. The proposed research design was necessarily broad in nature in order to incorporate those pertinent anthropological and historical questions which may be addressed, in this area as well as others, using an archaeological approach. In essence, the research design developed a model for frontier dynamics appropriate to the study of historic redwood logging. It further proposed a series of questions within five problem domains: environment, technology, economy, society, and culture. The domains served as the basis for estimating the information potential of various sites and features associated with logging and lumbering activities. They further guided the evaluation of documentary, oral, and other historical sources.

During the course of initial research, it was discovered that the archives at Michigan State University housed the Hackley-Hume papers, which contained records pertinent to the Hume-Bennett and Sanger Lumber companies (companies which comprise Phase III in the chronology of this report). A change order allowing for additional archival research and data collection from these records was issued by the Sequoia National Forest and the Principal Investigator travelled to Michigan to evaluate these records. All records pertinent to the Hume-Bennett and Sanger Lumber companies were examined, including the letter books, insurance policies, land and equipment inventories, machinery orders, shipping manifests, income tax and other financial statements, and timber survey reports. All maps, land plats, and photographs of the project area in the collection were also inspected. In addition, the Principal Investigator interviewed Mrs. Jean Hume Browning, daughter of the president

of the Hume-Bennett and Sanger Lumber companies and donor of the Hackley-Hume papers to Michigan State University, at her home in Spring Lake, Michigan. Mrs. Browning provided information about the collection, the Hume-Bennett and Sanger Lumber companies, and life at the mill town of Hume during her early childhood, and identified potential oral history informants in the Sanger-Fresno area. A copy of some of the pertinent sections of Mrs. Browning's annotated quide to the Hackley-Hume papers is presented in this report as Appendix C.

A trip to the Supervisor's Office of the Sequoia National Forest in Porterville, California was made by the research assistant to discuss the status of research up to that point and to acquire necessary documents on file there. Sonia Tamez provided copies of all pertinent site record forms compiled for the historic logging remains to date. In addition, color aerial photographs for specific portions of the project area which contain known historic redwood logging resources were obtained to assist in viewing the general settlement pattern, transportation linkages between sites, and the present-day appearance of known sites. Other pertinent materials were collected, such as overviews of Forest lands in the general vicinity, articles on the evolution of the Sierra redwood, local history accounts of the immediate area, and reports on the archaeological significance of certain remains likely to be encountered in the Hume Lake Ranger District.

A two-day field reconnaissance was made in order to acquire familiarity with some of the material remains of this historic activity, to provide more reliable locational data, and to assess the condition of the resources remaining. With the assistance of John Moore of the Hume Lake Ranger District, the research assistant examined and photographed several known

sites and locales associated with redwood logging and lumbering, including The Boole Tree, Hume Lake and Dam, Indian Basin, and remnants of the Hume Lake sawmill and associated buildings. Among the sites observed and photographed were concrete foundations, stone walls, sections of railroad grades, chutes, and skidways. An attempt was made to visit Camp 7 between Windy Gulch and Evans Creek, but no access route was available. Due to time constraints, no attempt was made to record the sites visited.

During the field visit an attempt was made to locate various sites from site record forms collected at the Porterville office. Of the three sites selected, two could not be located due to inadequate locational data; the third was found after much searching. The general nature of the site records was poor, not only in the quality of the locational data but in the descriptive and reference sections as well.

Review of documentary sources was made in light of the pertinent research questions outlined in the research design. Most of this research centered at the University of California at Berkeley. The collections of Paul Spivey, housed at the Bancroft Library, were intensively examined, and specific sources at the U.C. Forestry library, as well as more general sources at the Main and Moffitt libraries, were located and reviewed. In addition,three trips to the Forest History Society in Santa Cruz were undertaken and all pertinent records were examined.

A second field trip to the Fresno area was undertaken by the research assistant in order to discover and review pertinent documentary sources not available in the Bay Area (e.g., documents housed at the Fresno

County Recorder's and Assessor's offices and the special collections at the Woodward Library, Fresno State University) and to interview individuals who might be knowledgeable in the history of this area.

At this time, a second trip was made to Porterville, where Glenn Caruso of the Sequoia National Forest provided additional site records and maps. General histories of Tulare County, only available in the Porterville Library (Stiner 1934), were reviewed in order to reconstruct some of the early lumbering carried out in northern Tulare County.

Harold G. Schutt, an expert in "sequoia lore," was interviewed at his home in Lindsay, about ten miles north of Porterville, by the research assistant. Mr. Schutt was kind enough to spend a few hours discussing the logging and lumbering in this region and to review his collection of historic logging photographs for the Hume Lake area. He graciously loaned photographs from his collection to have copied for this report.

Donald C. DeVere of Fresno, the compiler and draftsman of the maps in Johnston's book, *They Felled the Redwoods*, was also interviewed by the research assistant. He very graciously gave permission to use his maps for this report.

John Moore of the Hume Lake Ranger District shared available materials on the historic redwood resources on file at the District Office. Albums of photographs, mostly duplicates of the Spivey and Schutt collections, site records for the located and recorded resources, and documents and correspondence located in their special interest file were reviewed. In addition, an interview with Bruce Waldron, the Hume Lake District Ranger, was carried out regarding the historic redwood logging resources located within the project area.

Evaluation of Sources

Documentary research alone is not sufficient for a fully reliable assessment of logging's material remains, especially in view of the poorly developed historiography of logging and lumbering in this region. The absence of professionally done historical studies of the lumber industry in the southern Sierras does not mean that documentary data which would permit such investigations are nonexistent. Rather, the lack of historical scholarship in this area simply reflects the interests and preoccupations of western economic and social historians. The following section describes the kinds of documentary and other historical sources that do survive and evaluates them in terms of their usefulness for answering important questions regarding the lumber industry in its technological, economic, and social dimensions. This evaluation serves as a basis for estimating information loss, should different types of logging-related material remains be destroyed without appropriate study.

The documentary record is divided into two general categories: primary and secondary. Primary records are those accounts -- both public and private -- reported by individuals who actively participated in the recorded narrative, while secondary records are those that were written by individuals who did not personally witness the events they described.

Primary Sources

The Hackley-Hume papers. The records of the Hackley-Hume papers, housed at the Michigan State University Archives and Historical Collections, offer essential primary accounts of the everyday operations of the Hume-Bennett and Sanger Lumber companies -- the dominant logging concerns in the area from 1905 to 1927. Apparently, no other company's records exist for the earlier lumbering operations carried out within

the Hume Lake Ranger District. This absence is unfortunate, as a complete set of records for all logging operations in the area would provide specific dates and names for this era which are now either entirely lacking or were treated cursorily by previous researchers. As these operations occurred prior to the turn of the century, individuals who actually participated are almost certainly deceased.

The Hackley-Hume papers span almost 100 years and consist of a large quantity of records which do not relate directly to the logging operations within the project area. Most of Hackley's and Hume's business concerns were logging-oriented, however, operating in places such as North Carolina, Michigan, Louisiana, South Carolina, Arkansas, Florida, Minnesota, Wisconsin, and British Columbia. Though not directly pertinent to the project area, the complete collection of these papers could provide the data for a comparative study of the growth, development, expansion, and migration of the lumber industry as a whole, placing in perspective the degree to which specific redwood logging operations were responsible for direct or indirect changes in logging methods or in the technological growth of the industry. It has been suggested that the lumber industry began in the east, migrated to the Great Lake states, moved on to the south, and finally made its way to the Pacific Coast, while the development of the machinery used for lumbering took the opposite route (Swigert 1949:62). The analysis of machinery and shipping manifests for the Hume Lake region, as well as other areas covered by these papers, could test this hypothesis regarding the development and diffusion of logging technology.

The most immediately relevant records contained in the Hackley-Hume papers are the plats and sketch maps, prepared as part of the timber

reports and engineering surveys, and the inventories of equipment, machinery, and landholdings. The latter were made at the time of the Hume-Bennett Lumber Company's acquisition of The Sanger Lumber Company in 1905, and at subsequent intervals in the company's expansion during the period 1905 to 1923. An intensive analysis of the plats would allow for a more detailed explication of the temporal and geographical expansion of this company than is now offered by any of the secondary sources available. Each plat should reflect the organization of the company at that time, and the expansion proposed or realized should reflect the decisions of higher management.

One plat in particular, drawn in 1912, shows the Hume-Bennett timber holdings in Fresno and Tulare counties and indicates the location of mill towns, logging camps, hoists, and railroad grades, both existing and proposed. A copy of this plat should be obtained from the Michigan State Archives, as it would greatly assist in the field identification of associated features and sites within the project area (see Appendix A).

Company inventories, shipping manifests from various suppliers of mill machinery, and mill blueprints contain a wealth of detailed information regarding the specific technology employed by the Hume-Bennett Lumber Company. A comparative analysis of these records with other lumber companies's records of the same type could allow for a more precise statement as to the technological position of this particular company relative to logging technology as a whole during this time period. Such an analysis could also allow for an assessment of the degree of adaptive and/or innovative strategies of this particular organization. Did the lumbering concerns in this area employ technology

developed for smaller trees, using it unaltered, or did they attempt to incorporate innovations to deal with the big trees? A comparison of these inventories and manifests with personal supply lists could delineate the areas of the organization in which costs were cut during times of economic repression. In short, the nature and extent of the company records located in the Hackley-Hume papers are such that, with more intensive analysis and comparison with other documents of the same order, many relevant research questions of economic, technological, and social/cultural change posed in the research design can be addressed. The lack of any other company records for this area increases the significance of this collection.

The basic limitation of the Hackley-Hume papers is the fact that they contain only the records which either originated in Michigan or were sent to the home office as duplicates. The bulk of the Hume-Bennett and Sanger Lumber company records which reflect their monthly and yearly operations in California are absent. As a result, there are no payroll and personnel documents, only selected machinery and equipment orders, and only a handful of shipment manifests and bills of lading. Most of these materials were likely never sent to Michigan, and those examples that are included appear to mainly represent what was necessary for the preparation of the annual report and income tax statements or to document insurance claims. No evidence was uncovered during other research to suggest that these local records, kept at the Sanger office, are still extant. Especially disappointing is the lack of information on employees, their families, company housing arrangements, and company store inventories. All of these sources would have greatly enhanced the value of excavated materials from the towns of Hume and Mill-

wood and the outlying field camps. Nevertheless, as a body of primary data for the study of numerous topics in forest history, the Hackley-Hume papers are invaluable (Honhart 1979:136-143).

The Spivey Collection. Paul Spivey, who worked for the United States Forest Service for a number of years, became very interested in the historical remains located within the Hume Lake Ranger District. Throughout his service he collected information, photographs, and oral accounts. Although Spivey's intention was to compile his information and have it published, he died before this could be accomplished. As Spivey was a long-time resident of the project area, he conducted comprehensive oral interviews with a large number of individuals who were directly involved with the logging and lumbering operations as well as with local history experts. Most of his notes stem from these interviews. It is the timely nature of his collection that makes it an essential and significant resource in studying the logging of the Hume Lake Ranger District. Many of Spivey's informants are long since deceased, and the extent of information he collected can probably not be duplicated today. Since his death, most of Spivey's materials were collected by his wife and donated to the Bancroft Library at the University of California, Berkeley. This collection is accessioned and available to the public for study and is the single most informative primary source on Hume Lake historic logging so far located in California.

Three forms of information are located in Spivey's collection: files of notes, interviews, correspondence, and newspaper clippings; ten volumes of annotated historical photographs; and numerous maps and land plats of the Hume Lake region, some of which are duplicates of the Michigan collection. It should be determined exactly which maps

located at the Michigan archives are, in fact, duplicated in the Bancroft, as this would prevent unnecessary reproduction or travel costs in the future.

There are twenty file folders of information in this collection (see Appendix D). Folder one, correspondence to Spivey, is significant for several reasons. Not only does it contain specific information in the letters, but it also contains the names of possible informants living throughout the state who have photographs or other information, as well as names of individuals who once worked at the logging camps and towns. From this source, a partial reconstitution of individuals working for the various companies is possible. Through this population reconstitution, many of the questions relating to social and cultural dynamics outlined in the research design could be addressed, and any testing or excavation in the future would thus become much more relevant. Because of time constraints, a full compilation of these names was not possible; however, it is recommended that these data be collected and an intensive oral history program be developed, as many of the individuals connected with this portion of California history are aging, and this information may soon be lost. The majority of the individual's names mentioned throughout the collection of folders are connected with the last phase of logging, and much of the remaining information deals with the Hume-Bennett operation (Phase III) as well. This focus is consistent with most of the documentary sources concerned with the lumbering of this particular area. The Spivey collection, however, contains a large amount of information for the entire historic logging system within the Hume Lake Ranger District and was one of the primary sources used for the compilation of this overview. For example, located within the file

folders are examples of time sheets showing the pay scale and lumber prices at particular times; these data were used here to illuminate the economic climate of the southern Sierra lumbering concerns at the turn of the century.

Also within the Spivey collection are ten volumes of photographs. These photographs, as well as those from the Schutt collection, were essential in the preparation of this report. These two collections of historical photographs, together with those included in the Hackley-Hume papers, those on file at the Hume Lake Ranger District, and others in the possession of numerous individuals, such as Mr. Edwards of Porterville, comprise an essential research source for reconstructing activities involved in historic logging, as well as identifying people participating in this industry. Much of the descriptive and typological portions of this overview relied heavily upon photographs to characterize the system as it once operated. The usefulness of historical photographs cannot be overstressed, especially for students of cultural and technological change, as it "is the information that can be extracted from the image" that is so useful as "much of culture is visual" (Peters 1980:1)

The photograph collection offers excellent glimpses into the life, times, and area of historic redwood logging. These photographs, themselves a cultural resource of historic redwood logging, are protected and preserved in the Bancroft Library. The photographs become more important and essential in the understanding and synthesis of the system which they represent as time passes, and the destructive forces of nature, expansion, and vandals work against the remaining evidence of this industry Although most individuals in the photographs are in posed position, the photographs offer evidence of the method of logging, skidding, milling,

and hauling; they offer evidence of the technology available, or at least being employed, which can then be compared with that used in other areas and other times; they offer insights into the environmental setting of camps, mills, chutes, hoists, dams, and towns; they depict the biotic community growing alonside the trees that were being logged; and they offer insights into the personal possessions, clothing, and even the attitudes of the people involved. In short, historical photographs are artifacts and, as such, are "always genuine" (Glassie 1975).

One volume in the Spivey collection that deserves special mention is a photographic essay depicting the evolution of the Hume Lake Dam from its inception to its completion. The dam at Hume is an extremely significant cultural resource, as it was the first multiple-arch dam built in the United States (in 1908) and was considered a technological wonder. It still stands today and is readily accessible to the public. The pictorial essay reflects the technological status and achievements of the day and can offer useful insights into the development of this unique type of dam.

The last component of Spivey's collection contains various maps, ranging from 1913 to 1922 -- again, relating to the last phase of lumbering in this region. Most of the maps are timber cruise maps, showing the amount of timber available and/or logged in specific areas. Through a much more intensive study of these maps than was possible under this contract, the actual areas and amount of timber logged over a period of time could be assessed, and a diachronic interpretation could be posited. Again, this is essential information for assessing the actual management decisions being made at particular points in time and may, in combination with sufficient field data, allow for an explanation

of the Hume-Bennett Lumber Company's eventual failure, despite the enormous amount of capital invested. These maps should also be consulted in any attempt to do further survey work in this area, because they contain more specific locational data than any available secondary source.

Public documents. Among the primary records for this area are Federal Government records, such as USFS site record forms prepared by Forest Service staff and/or seasonal archaeologists. It is fair to say that, in general, these forms are poorly prepared and include unreliable locational data. There are exceptions, especially the reports prepared by John Moore of the Hume Lake Ranger District and by Lorna Rocha, a seasonal archaeologist for this district during the summer of 1980.

Records of timber sales for the historic period are also helpful in assessing the dynamics of the lumbering operations, as they offer information as to the number of acres, the location, and the date of logging. In addition, the method of logging is noted, which can offer information as to the status and development of the technology for the temporal period, as well as the geographical area.

Tabular records of land transfers and deeds are available in the Fresno County Assessor's Office. The Grantee-Grantor, Grantor-Grantee records indicate the buyers and sellers for specific parcels of land. In reviewing these records, the suspected fraudulent acquisition of many acres of timber land along the Kings River watershed was confirmed. An intensive analysis of these records could also clarify much of the confusing chronology of Phase I, in addition to providing names of individuals who were involved in each transaction.

State and Federal census data are also significant public resources,

as they allow for an examination into various levels of historic societies, e.g., general levels as well as the level of the individual. Records such as the Federal Manuscript Census reports are essential to the historic archaeologist if he wants to describe, analyze, and interpret the behaviors of individuals who participated in the activity under study.

Additional sources. Other useful primary records for this area are explorers's and naturalists's accounts. Expecially informative for this region are the accounts of Brewer (1966) and two volumes by Muir (1894; 1912). These sources are especially pertinent and offer excellent botanical descriptions of previous times, as well as personal views of the timber harvesting being carried out. It is well known that Muir was appalled at what was happening to the Sierra redwoods. He was instrumental in saving several groves by placing pressure upon the U.S. Government to purchase these areas, thus taking them out of private hands which may have been interested in harvesting the trees. Muir's accounts express the voice of individuals who were set upon preserving the Sierra redwoods and reveal specific attitudes towards the environment which were present in the early logging era.

Because these trees attracted the early attention of various preservation groups, the Government was called into the area to assess the Big Tree's status. Two such accounts are especially pertinent for this area. One, a Federal investigation (U.S. Department of Agriculture 1900), offers a brief history of the tree and discusses its distribution, the owners of specific groves, and their status at the turn of the century. Another report, a State investigation (California, State of 1952), is much more thorough and up-to-date regarding the delineation of known groves and their ownerships. It presents a brief overview of the

logging in the southern Sierras and specifies groves that should be acquired by the State to prevent their future destruction.

Individuals. Persons who participated in or were associated with the lumbering operations can be considered as primary sources. For example, Mrs. Jean Hume Browning, a young girl at the time of the Hume operations, was interviewed at her home in Michigan by the Principal Investigator and gave an account of her experiences growing up in an early lumber mill town. Her father's letters to various State and Federal officials during the period when the Hume's were attempting to sell their landholdings in the project area are also very revealing about attitudes toward conservation and the political context of preservation efforts during the 1920s and 1930s. A synopsis of these letters is contained in Jean Hume Browning's annotation of the company letter press books.

Other types of informants are people who have studied the local history extensively and/or are long-time residents. Individuals such as Harold G. Schutt, for example, are very helpful because they have collected information and photographs over an extended period of time and have many times interviewed the individuals who were an integral part of the historic system under study but who are no longer alive.

Hank Johnston, a researcher in this specific area, no doubt has collected pertinent information and could offer advice as to the most promising avenues of inquiry to pursue. Members of the local historical society, such as Sue Thorne and John Olson, are very helpful in passing along information as to what has and has not been studied in a particular area and can offer advice as to where pertinent information may be located. These individuals should also be interviewed, and a trans-

cript should be forwarded to the Forest History Society in Santa Cruz.

Secondary Sources

General county histories. The most common secondary sources available are general county histories. Many are often referred to as "mugbooks," as at least half of each book usually contains biographies and photographs of prominent citizens of the area -- not the common logger (Anonymous n.d.b.; Elliot 1882, 1883; Winchell 1933). For an insight into the common person, these sources are not usually helpful; however, they do offer information on the early economic and social development, although in varying degrees of quality. Their main contribution, therefore, is that they provide a context for the study area.

A couple of histories of this area have been published in cooperation with the Park Service (Strong n.d.; Engbeck 1973). They are concerned with the Park Service or other specific areas, but they do offer insightful information on the history of the area.

Local histories. Other valuable sources are local histories. Three sources cover the project area in particular: *They Felled the Redwoods* (Johnston 1966); *Redwood Classic* (Andrews 1958); and *They were Giants...in Those Days* (Johnson n.d.). The last book is mostly a compilation of other sources and is poorly referenced. Andrews's book is concerned with the redwoods of the coast as well as the Sierra and therefore does not treat the area of the Hume Lake Ranger District in any great detail; its primary contribution is that it describes general logging and lumbering operations and allows for a comparative view of redwood logging throughout the state. Johnston's book, however, treats in depth, and is the only such source at this time to do so, the

historic redwood logging operations carried out in this area during the late eighteenth and early nineteenth centuries; Phase I is neglected, but phases II and III are detailed in a descriptive text with accompanying photographs from various collections. This book is an excellent and essential source for initiating research in the area and, because it is largely based on Jean Hume Browning's exhaustive annotation of her father's papers, it appears to be fairly reliable. Although poorly referenced throughout the text, the collection of photographs reproduced in this book are an extremely valuable research tool.

Another valuable asset of Johnston's book is the series of maps and drawings compiled and drawn by Donald C. DeVere. DeVere constructed these maps from on-site visits with informants who previously worked in the area (personal communication). They offer an excellent bird's eye view of the logging system that once operated in this area. The maps are, however, very generalized; they do not offer the ideal that would be required for archaeological research as outlined in the research design. They would be very useful, though, as a starting point, as they appear to be fairly accurate. It should be possible to take these maps and retrace the information onto 7.5' series USGS maps, which would enable the archaeologist to record more reliable specific locational data necessary for the representation of the entire system. In assessing the historic logging system within the Hume Lake Ranger District, the maps in Johnston's book should not be taken as representing the entire range of resources located within the District today, as aerial photographs on file at the Sequoia National Forest show other features, especially linear features, not designated on DeVere's maps. Using both sources together, an accurate and complete locational map could be

developed and should be a first step in future surveys.

Another local history, although not directly related to this area, is *The Men of Mammoth Forest* (Otter 1963). This book is concerned with an area south of the project area and deals with a greater temporal period. Its value lies in its chronology of the region and the description of the early logging and lumbering of an adjacent area. It is, as are most accounts dealing with the early phase of logging, rather sketchy when treating the earliest lumbering concerns in this region, but is the clearest account of all those reviewed.

Hawksworth and Hawksworth (1979) present an overview for one grove of redwood trees north of the project area (Nelder Grove). A small portion of the report deals with logging within the Nelder Grove, but it appears to be minimally researched. It is useful for research on historic redwood logging remains, however, in that it illustrates the geographical extent to which the redwoods were victims of the logger's axes. Further research regarding the extent to which the Sierra redwoods were logged should be carried out and placed in a regional context, as the logging of this tree represents a unique chapter in the history of the lumber industry, as well as the history of California as a whole.

In summary, it may be said that many important aspects of the historic logging operations which were carried out within the Hume Lake Ranger District, particularly during the early period, are not well documented. In a letter from Ralph D. Ranger, a railroad historian, to Mr. Spivey on 17 June 1965, he stated: "You [Mr. Spivey] are right on the lack of information on the Hume-Bennett and Sanger operations..." (Spivey Collection). Even these men, who had spent many years researching

this subject, found little in the way of hard evidence for the third phase; the two earlier phases have even less.

Chapter 3

PROJECT AREA BACKGROUND AND SUMMARY

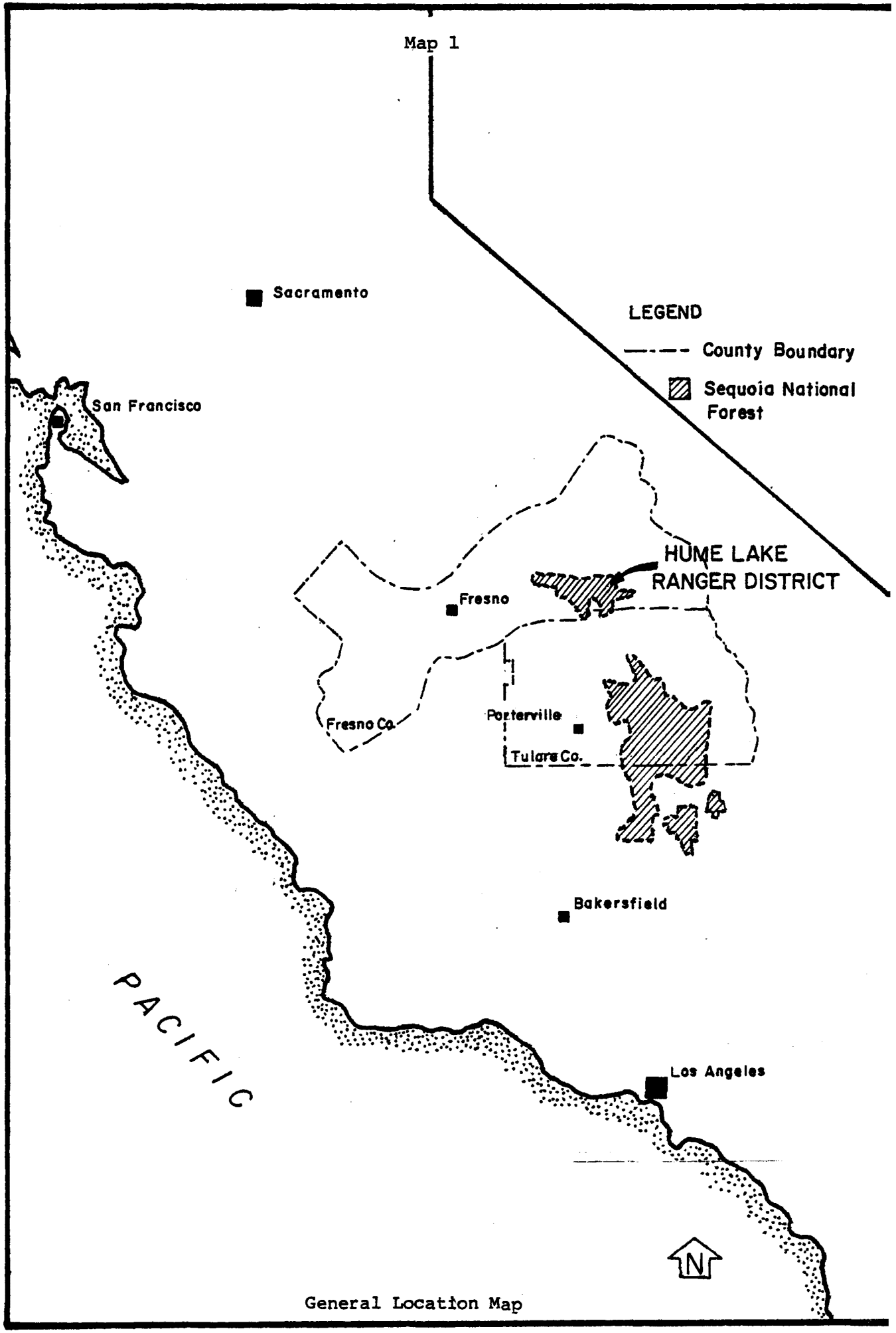
Project Location

The Hume Lake Ranger District, which acquired its name from a lake formed by the Hume-Bennett Lumber Company in 1908, is one of five Ranger Districts of the Sequoia National Forest in south central California. The Sequoia National Forest extends from Kings River in the north to Kern River in the south. Its eastern boundary runs along the crest of the Sierra Nevada mountain range; its western boundary is adjacent to the foothills of the San Joaquin Valley. The Hume Lake Ranger District is the northernmost District and lies separated from the main portion of the Forest, approximately fifteen miles to the northwest. It is situated approximately fifty miles east of the city of Fresno (see map 1).

The northern boundary of the Hume Lake Ranger District runs along the Kings River and Canyon and abuts the southern boundary of the Sierra National Forest, while the North Fork of the Kaweah River forms the southern boundary. The Hume Lake Ranger District extends from Pine Flat Lake and Reservoir in the west to the summit of the Sierras in the east. Mount Hogback, approximately 10,000 feet in elevation, is adjacent to the southeastern boundary. The south central portion of the District is interrupted by a segment of the Kings Canyon National Park. The Fresno-Tulare County boundary line runs in a general east-west direction through the southern portion of the District (map 1).

General Physiography

The Sierra Nevada began its formation about 210 million years ago



General Location Map

(Hill 1975:1). From roughly 440 million years ago to about 130 million years ago, an ancient sea covered the area where today's Sierra Nevada is found. Up until about 38 million years ago, the formation of the Sierra Nevada was a relatively slow process, with summits reaching only about 3,000 feet; about 30 million years ago, however, violent volcanic eruptions commenced, and the Sierra Nevada rose rapidly (Hill 1975:3). Following these "days of fire," which lasted roughly 36 million years, were the "days of ice." The glaciers of this period formed in various valleys, destroying much of the vegetation along the way. Erosion and earthquakes have continued to mold the present-day Sierra Nevada (Hill 1975:5).

The Sierra Nevada mountain range is between fifty and eighty miles wide and extends in a northwest-southeast direction for over 400 miles. Its southern peaks attain heights of over 14,000 feet, while those further north average about 8,000 feet (Hill 1975:42). Extending east from the Great Valley, the Sierra Nevada rises gradually to its summit and then drops precipitously to the east.

The project area is located within the Intermontane Plateau system of the North American Cordillera major geomorphic division, one of five major geomorphic divisions of North America (Strahler 1975:515-516). The Intermontane Plateau system is comprised of seven geomorphic provinces, of which the project area location is within the "Basin and Range" geomorphic province (Strahler 1975:516). The Basin and Range geomorphic province is characterized by high, rugged mountains and broad intermontane plains, with typical elevations ranging from 4,000 to 12,000 feet. Situated along the western slope of the Sierra Nevada are "groves" of *Sequoiadendron giganteum* (Sierra redwoods) -- trees which

were to become an important factor in the development and settlement of the western Sierras, as well as the San Joaquin Valley.

Sequoiadendron giganteum Discovery and Naming

It is generally agreed that the first white men to see the Sierra redwoods were members of a surveying party which crossed the Sierra Nevada mountains in 1833. This group, members of the Captain Joseph R. Walker party, were on a reconnaissance which brought them westward from Salt Lake City, over the Sierras, and into the San Joaquin Valley (Beck and Haase 1974:43). A clerk of this expedition, Zenas Leonard, wrote in his journal, "in the last two days' travelling we have found some trees of the Redwood species, incredibly large -- some of which would measure from 16 to 18 fathoms [96 to 108 feet] around the trunk at the height of a large man's head from the ground" (quoted in Fry and White 1938:8). This journal was published in a Pennsylvania newspaper but did not achieve wide public circulation. Between 1833 and 1852, numerous accounts of discovering the Sierra redwoods surfaced, but again no widespread acknowledgment of these trees was forthcoming. It was not until 1852 that the Sierra redwoods were again rediscovered and brought to the attention of the world.

According to Johnston, the story goes that A.T. Dowd, one of four hunters for Murphey's Camp, while tracking a wounded grizzly stumbled across a grove of Sierra redwoods of such immense proportion that he forgot about his pursuit and returned directly to camp. Upon entering the camp, Dowd related to his fellow workers that he had just discovered trees the size that had never before been seen. No one, however, believed his story. Dowd, realizing that his story was perhaps unbelievable, bided

his time and waited for a more opportune moment to get members of Murphey's Camp to go into the forest and see for themselves the grove of Big Trees. Not long after his discovery, Dowd came into camp exclaiming that he had just shot the largest grizzly bear that he or anyone had ever seen; this story the people could believe, and followed Dowd into the forest. Of course his story was pure fabrication and was only told to get members of the camp into the forest to see for themselves the immense trees he had previously encountered. After a frantic search for the grove, Dowd finally led the group to the trees, at which time he was reportedly said to have stated, "Now, boys, do you believe my story?" (Johnston 1966:15).

Many newspapers and magazines published accounts of Dowd's discovery, and soon the Sierra redwoods were known worldwide. Due to widespread circulation of Dowd's find, he soon became known as "the" discoverer. The Sonora *Herald* was most likely the first newspaper to print information on these Big Trees (Ellsworth 1924:128). This account was apparently republished in a San Francisco newspaper and, in 1853, in the London *Athenaeum* (Ellsworth 1924:128). These publications attracted the attention of three separate groups of individuals: the skeptics, the curious, and the scientists (and, not much later, the industrious). Most people dismissed the stories of such gigantic trees as typical Californian ludicrousness. Others, curious to see these trees, travelled to the Sierras to experience them first hand. With the influx of these people, many more Sierra redwood groves were soon discovered and their locations and distributions recorded.

Botanists the world over were confronted with a species of tree they had never before encountered. The subsequent task of classifying and

naming the Sierra redwood was beset with emotional, ethnocentric, and scientific problems. The California Academy of Sciences in San Francisco was the first to receive specimens of the Sierra redwood (in 1853), but due to a lack of previous findings and references, they could not precisely determine the species' proper place within scientific taxonomy (Ellsworth 1924:128).

From 1853 to 1898, various names (many stemming from emotional values) were assigned to the Sierra redwoods. It was initially described and classified as *Wellintonia gigantea* by an English scientist, Lindley, in Gardner's *Chronicle* on 24 December 1853 (Ellsworth 1924:129). The following year, Decaisne, a French scientist, recognized its similarity to the Coast redwood (*Sequoia sempervirens*) and called it *Sequoia gigantea*. Other names to be attributed to the Sierra redwood were *Taxodium Washintonianum* by Winslow in 1854; *Sequoia Wellintonia* by Seeman in 1855; and *Sequoia Washintoniana* by Sudworth in 1898 (U.S. Department of Agriculture 1900:22). As can be seen from some of the names attached to the Sierra redwood, certain individuals, namely the Duke of Wellington of England and General George Washington, were the inspiration and reason for naming the Big Trees, not scientific rigor and principles of botanical classification.

Even what scientific precedents were used were beset with problems in attempting to name and correctly classify the Sierra redwood. Once the close relationship between the Sierra redwood and the Coast redwood, demonstrated by Decaisne in 1854, gained widespread acceptance, the designation *Sequoia gigantea* took hold. Not only had Decaisne performed under a more rigorous scientific process, he also was the least emotional about the classification. Stemming from this classification, the Sierra

redwood soon took on terms such as "Big Tree" and "Giant Sequoia." And when a national park was to be created in the southern Sierras in 1890, the Visalia *Delta* suggested the name "Sequoia National Park" (Strong n.d.:27). For over eighty years the name *Sequoia gigantea* was inculcated into the public's mind. In 1939, however, a professor of botany, John T. Buchholtz, realized that the Coast redwood and the Sierra redwood did not actually belong to the same genus and proceeded to reclassify the Sierra redwood as *Sequoiadendron giganteum*. A reference chart on the similarities and differences of these two trees is offered as Appendix E. Although it is unlikely that any parks, forests, or specific groves will incorporate the change in their name, this name is now becoming the accepted scientific designation for the Sierra redwood.

Sequoiadendron giganteum and Geologic History

Geologic time is generally divided into four main eras, which are in turn divided into various periods. These periods are further comprised of epochs, and each division, with its respective subdivision, is assigned a relative date. A table of these divisions is offered as a reference chart (table 1).

While the Coast redwood and the Sierra redwood were found to be members of different genera, they do belong to the same family of trees, *Taxodiaceae*, thought to have originated about 200 million years ago (mya) in the Triassic Period of the Mesozoic Era (Engbeck 1973:60). The oldest known fossil of a redwood, found in France, dates to the Jurrassic Period (ca. 175 mya), also of the Mesozoic Era. At least twelve fossil species of Sequoia have been recorded (Fry and White 1938:103)

TABLE 1

GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH	AGE*
CENOZOIC	Quarternary	Holocene	
		Pleistocene	2-3
	Tertiary	Pliocene	12
		Miocene	26
		Oligocene	37-38
		Eocene	53-54
		Paleocene	65
MESOZOIC	Cretaceous	Late Early	136
	Jurassic	Late Middle Early	190-195
	Triassic	Late Middle Early	225
PALEOZOIC			570
PRECAMBRIAN			3600+

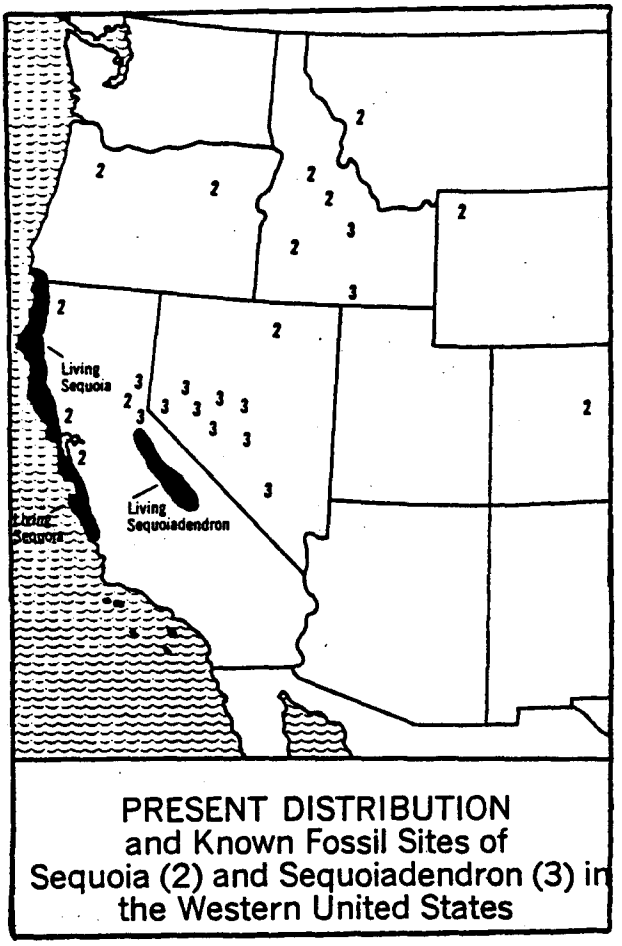
*million years

Distribution of fossils in relation to present distribution in the western United States is shown on Map 2a.

During the Cretaceous Period (ca. 65-136 mya), the redwood family became a dominant factor in the coniferous forest. Engbeck (1973:60-61) drew an interesting sketch of the parallel development, distribution, and eventual decline between the large redwoods and the dinosaurs and other giant reptiles throughout the Mesozoic Era. Although the dinosaurs and giant reptiles became extinct, the giant sequoias continued to live on, but only in much restricted areas relative to their once widespread distribution.

At the close of the Cretaceous Period and the onset of the Cenozoic Era (ca. 65 mya), the redwoods were found over four continents: North America, Europe, Asia, and Greenland (map 2b). These large redwoods differed substantially in their morphology from today's species and were also associated with different plant communities (Axelrod 1959:9). During this period, The Tertiary, the redwoods were generally found in middle to high latitudes of the northern hemisphere; paleobotanists refer to this specific plant community during this particular time as the Arcto-Tertiary Geoflora (Axelrod 1959:11).

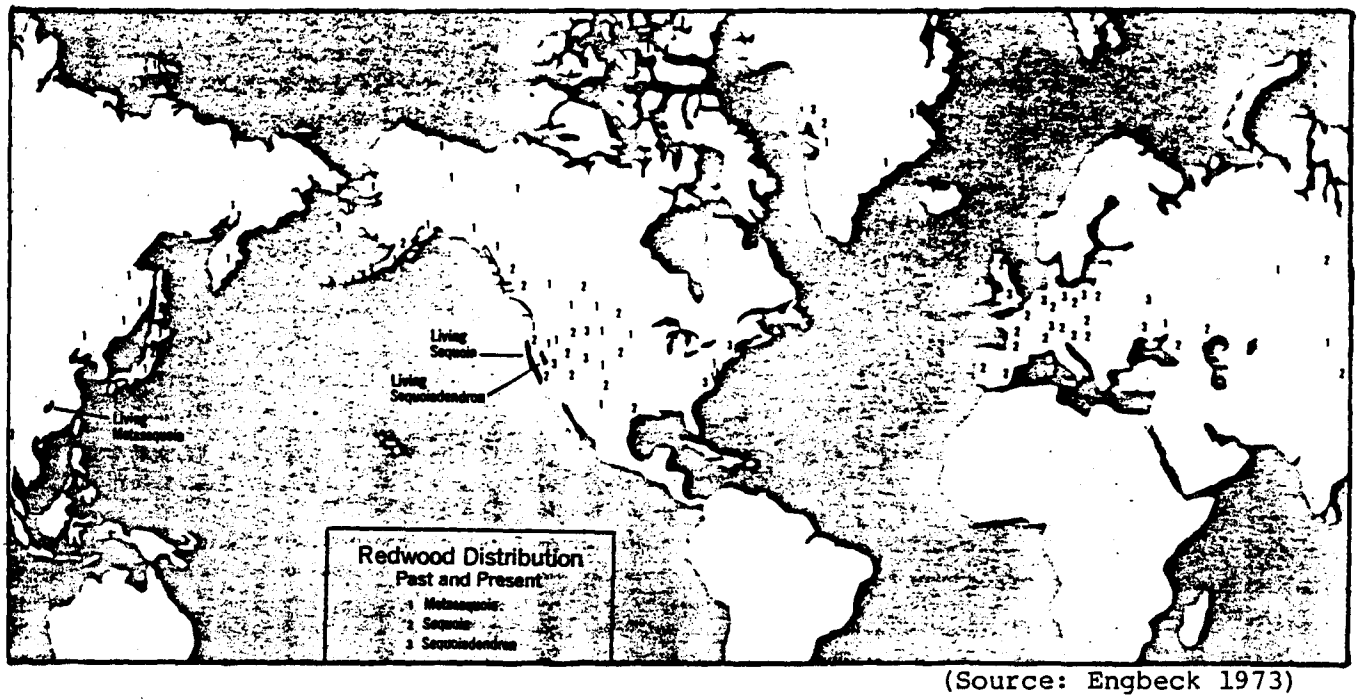
During the late Tertiary, the redwoods reached their maximum expansion northward, extending to Greenland, Iceland, Spitzbergen, Ellesmere Island, and northern Siberia. Because only two species of living redwood were known at the time of the fossil discoveries, the samples found in the arctic region were forced into the *S. sempervirens* classification, based on similarities in morphology. This grouping presented a problem among botanists of the time, as the Coast redwood is known to be poorly suited to such extreme cold temperatures. The problem was solved by



PRESENT DISTRIBUTION
and Known Fossil Sites of
Sequoia (2) and Sequoiadendron (3) in
the Western United States

(Source: Engbeck 1973)

a: Fossil sites of *Sequoia* and *Sequoiadendron*



(Source: Engbeck 1973)

b: Worldwide distribution of redwoods, past and present

Tsang Wang, a Chinese forester, when he discovered a new species of living redwood, *Metasequoia* (Dawn redwood). Through a close analysis of the Dawn redwood's seeds and cones, he noticed that they closely resembled the morphology of the Coast redwood. Combining this discovery with the fact that the Dawn redwood is deciduous and loses its leaves in the winter, it was realized that the arctic finds were, in fact, fossils of the Dawn redwood (Engbeck 1973:61-62).

Throughout the Cenozoic, the Arcto-Tertiary Geoflora began migrating southward into more temperate environments and, in so doing, the composition of the plant community slowly and very slightly changed (Engbeck 1973:61). The oldest known fossil that is surely ancestral to today's *Sequoiadendron giganteum* comes from deposits of Late Miocene to Early Pliocene Age (Axelrod 1959:9). The morphology of this ancestral tree (*S. chaneyi*) is very similar to the living Sierra redwood, and "its fossil associates can scarcely be distinguished from those in the present community" (Axelrod 1959:9).

S. chaneyi remnants are known from Nevada and Idaho (see map 2a). Throughout the remainder of the Cenozoic, the giant sequoia steadily migrated westward. By the beginning of the Pliocene (ca. 12 mya), the giant sequoia had disappeared from Idaho and central Nevada, and by the middle of the Pliocene, it had taken hold along the eastern foothills of the Sierra Nevada. By the beginning of the Pleistocene (ca. 2-3 mya), in response to changing climatic conditions, the giant sequoia had disappeared in all areas except the western slopes of the Sierra Nevada mountain range (Engbeck 1973:65). The glaciers of this epoch may have created the discontinuous distribution of today's *Sequoiadendron giganteum* (Axelrod 1959:22), but other factors, such as the Altithermal which

followed the Wisconsin glaciation, may have also been a strong determinant (Engbeck 1973:66).

Sequoiadendron giganteum Distribution and Location

Today the Sierra redwood occurs only in discontinuous groves along the western slopes of the Sierra Nevada; its distribution ranges for approximately 250 miles, from the American River in Placer County in the north to Deer Creek in Tulare County in the south. The Sierra redwood is found at elevations ranging from 4,000 to 8,500 feet, with optimum growing elevations between 4,500 and 5,000 feet in the north and between 6,000 and 7,000 feet in the south (California, State of 1952:9). In direct contrast to the Coast redwoods, which occur in a continuous belt along the coastal fog belt from the California-Oregon border to Monterey, the Sierra redwoods occur only in widely scattered groves. These groves occur approximately midway between the summit of the Sierra Nevada and the foothills of the San Joaquin Valley (Fry and White 1938:39; map 2a; map 3).

The Sierra redwood groves are frequently divided into two groups -- the northern groves and the southern groves -- with the dividing line being the Kings River and Canyon. Of the seventy-five groves recognized (Rundel 1972), only eight occur north of the Kings River. In addition, the northern groves are relatively small and widely scattered (Engbeck 1973:58), while the southern groves are much more numerous and in certain places form a dense and nearly continuous belt (Engbeck 1973). The differences between the northern and southern groves exist primarily because of temperature and moisture differences which occurred during the Quarternary Period (Axelrod 1959:22). Rarely does a single Sierra

MAP 3

Distribution of *Sequoia sempervirens* and *Sequoiadendron giganteum*

redwood exist alone, outside of a grove, naturally. The existing groves are not pure stands of redwoods but include other trees, such as sugar pine, yellow pine, white fir, red fir, and incense cedar (Ellsworth 1924:30; Fry and White 1938:15).

The criteria of what constitutes a "grove" has fluctuated over time and among individual classifiers and is somewhat arbitrary (Rundel 1972:320). At present, the smallest grove constitutes only six trees (Anonymous 1971:61), while two other groves cover an area of over ten square miles each (Axelrod 1959:9).

Seventeen groves exist within the present-day Hume Lake Ranger District (Rundel 1972; table 2). Portions of two, the Big Stump Grove and the Grant Grove, are within the Kings Canyon National Park.

Of the remaining fifteen groves within the Hume Lake Ranger District, two -- the Converse Basin and the Indian Basin groves -- have been almost obliterated by logging operations carried out from the late 1800s into the early 1900s. Various other groves of Sierra redwoods have also been the focus of logging (e.g., Nelder Grove - Hawksworth and Hawksworth 1979; and Big Stump Grove - Johnston 1966) but none to the extent of the two previously mentioned. It was once believed that the Sierra redwood groves were on their way to extinction, but today there is much new growth, and the groves are at least stabilized, if not actually expanding (map 4).

General Settlement History

Early Spanish exploration

The Sierra Nevada was first seen by European explorers in 1772, when Captain Pedro Fages and a Franciscan missionary, Fray Juan Crespi,

TABLE 2

Sierra Redwood Groves within the Hume Lake Ranger District

	Name	Location
1.	Abbott Creek	T13S, R28E, Sec 30
2.	Agnew	T13S, R29E, Sec 13
3.	Bearskin	T13S, R28E, Sec 34
4.	Big Stump	T14S, R28E, Sec 7, 8
5.	Boulder Creek	T13S, R29E, Sec 26, 35
6.	Burton	T13S, R29E, Sec 28
7.	Cherry Gap	T13S, R28E, Sec 19, 20
8.	Converse Basin	T13S, R27E, Sec 12, 13 (includes Boole Tree) T13S, R28E, Sec 4, 5, 7, 8, 17, 19
9.	Deer Meadow	T13S, R29E, Sec 24
10.	Evans	T13S, R29E, Sec 15, 16, 17, 20, 21, 22
11.	Grant	T13S, R27E, Sec 36 T13S, R28E, Sec 31
12.	Indian Basin	T13S, R28E, Sec 4, 8, 9, 16, 17
13.	Kennedy	T13S, R29E, Sec 21(?), 22(?), 27, 28
14.	Landslide	T13S, R29E, Sec 30, 31
15.	Little Boulder	T13S, R29E, Sec 27, 34
16.	Lockwood	T13S, R29E, Sec 7, 8, 17
17.	Tenmile	T13S, R29E, Sec 35, 36

(compiled from: Rundel 1972:321-325)

entered the interior of California and viewed the mountains from near the confluence of the San Joaquin and Sacramento rivers (Farquhar 1965).

The Franciscan friars entered California in 1768 under the leadership of Junipero Serra. The previous Jesuit regime, created by the Spanish Court in 1677, had become so hated by the settlers that Charles III, in 1766, ordered the instant expulsion of all Jesuits from Spanish territory; the order went into effect in 1768. Serra, accompanied by fifteen other friars, arrived in Lower California in 1768 with the expressed concern to take possession of the former missions of the Jesuits, establish new missions (to help protect the country in case of attact), and to convert the natives encountered. The Franciscans focused their attention and settlement along the coast and paid little attention to the interior region, except to recover stolen horses or seek new converts. Thus the Sierra Nevada received very little attention at this time from European settlers. Various forays into the mountains to seek suitable mission sites were made; however, no permanent settlement occurred (Anonymous n.d.b).

It was not until 1806 that the Kings River area was explored extensively by the Spaniards. For several days, a party led by Ensign Gabriel Moraga, accompanied by Father Pedro Munoz, camped alongside the Kaweah River. Upon travelling north, they came across the Kings Canyon and named the river "Rio de los Santos Reyes" (River of the Holy Kings), today known as the Kings River (Strong n.d.:4). Moraga returned to the San Joaquin Valley in 1808 to attempt to locate a suitable site for the establishment of a mission, again, to no avail (Beck and Haase 1974:20).

Spanish expeditions into the San Joaquin Valley continued throughout

the next decade. Most of the expeditions were instigated either to return Indians who had fled from the missions along the coast or to lure new converts back to these missions (Beck and Haase 1974:21).

In 1822, Mexico acquired control of California, and expeditions into the interior valley continued in pursuit of hostile Indians or the recovery of stolen material goods. In 1825, for example, Jose Dolores Pico led an expedition along the San Joaquin River into the Sierra Nevada and then travelled south to the Kings River. A number of hostile Indians were killed, stolen goods were recovered, and new converts, as well as escaped neophytes, were found. It was considered a very "successful" mission (Beck and Haase 1974:22).

The 1830s and 1840s were marked by deteriorating relations, and many confrontations between the Miwok, Yokuts, and Western Mono (Monache) peoples and the Mexican explorers erupted. Matters worsened as the Mexican government attempted to ameliorate the situation with a heavy hand (Beck and Haase 1974:23).

American exploration and settlement

As early as 1826, American trappers were entering California in search of game. Jedediah Smith, with a party of men, came into California by a southerly route searching for beaver, reaching the Kings River area in 1827 (Strong n.d.:4). Various other parties, such as Ewing Young's in 1830 and Joseph Walker's in 1833-34, entered the region, but the area stayed relatively unknown. It was not until after California was acquired by the United States from Mexico that any official reconnaissance was performed.

The first survey was carried out by Lieutenant George H. Derby of the Topographical Engineers in 1850, but it resulted in little more

than a summary report (Strong n.d.:5; Otter 1963:7). The following year, Captain J. Kuykendall, accompanied by a company of troops, travelled between the Kings and Kaweah rivers. His mission was to bring the Indians of the area down into the valley to discuss the treaties that the U.S. Government was formulating. According to Strong, if the Indians refused to come to the talks, Kuykendall "was ordered to destroy [their] camps" (n.d.:6).

Immediately after California achieved statehood, a committee to subdivide the land into counties was organized, with General Vallejo acting as chairman, and on 15 February 1850, an act establishing 27 counties was passed (Beck and Haase 1974:61). Two years later, Tulare County was created from the southern half of the original Mariposa County. During this period, the population of California was increasing at an enormous rate, and changes in the counties were common. Fresno county was created in 1856, once again out of the original Mariposa County, as well as from portions of Merced and Tulare counties (Beck and Haase 1974:61-62). Both Fresno County and Tulare County continued to shift boundaries throughout the next three decades, but by 1893 their boundaries were fixed.

Early logging and lumbering history

Three general periods of history in this area have been identified (Otter 1963). The first period began with the Tule Indian War of 1856 and ended when public land had been completely surveyed in 1883. The second period, 1884-1904 -- the "era of the common man," characterized by expanding private enterprise -- ended when many of the private holdings were consolidated and managed by newly formed government agencies. The third period, lasting from 1905 to 1950,

was characterized by two major public agencies developing in the area and much of the land coming under their management (Otter 1963:4). Of particular importance in this report is Otter's second period, when the area encompassed by today's Hume Lake Ranger District was the scene of two large-scale lumbering operations. It was indeed a period of expanding private enterprise. The two large lumbering operations, carried out under four different names, were responsible for the only full-scale harvesting of the Sierra redwood along the western slopes of the Sierra Nevada. Prior to the large operations, however, many small mills had been built and operated in the area, but they were often destroyed by floods and fire, changed hands frequently, and moved often, making their history sketchy at best.

After gold was discovered in 1848, California was inundated by fortune seekers. They soon found that only a select few were going to strike it rich or even make a comfortable living, and most of them filtered to different parts of the state. With such a mass immigration of people, California's population rose rapidly, creating a heavy demand for lumber. In response to this demand many of the unsuccessful miners, as well as others, turned their attention to timber, and soon forests throughout the state were being exploited.

Initially, timber was whip-sawed, or felled and hewn by hand. Whip-sawing consisted of digging a large pit and installing a frame on top to hold a log. The log was then rolled over the pit and sawed by two men, one standing on top of the log and the other in the pit. According to Winchell:

> The machinery was of the most primitive design: a log carriage was fixed in position; the long-bladed upright saw hung from a framework over the carriage

> and when in action the teeth made a downward stroke through the log -- cutting only when in that direction (1933:50).

This form of sawing timber was practiced as early as the second decade of the 1800s in northern California, when the Russians sawed Coast redwood for the construction of their settlement at Fort Ross along the coast (Carranco and Labbe 1975:7). The earliest known whip-sawing "mills," however, were situated in the area of present-day Monterey and Santa Cruz.

Before long, water-powered sawmills were introduced, first appearing in the Los Angeles area in 1823 (Carranco and Labbe 1975:11). The operation of these mills worked on the same basic principle as whip-sawing, moving a vertical blade up and down, only now a waterwheel supplied the power. Then, in 1843, Stephen Smith introduced steam power into the lumber industry when he installed the first steam engine in a sawmill located at Bodega in Sonoma County. Accompanying these innovations, which allowed for an increase in total output of lumber, were rapidly rising demands, and therefore rising prices. For example, in the 1830s, lumber brought about $50 per thousand board feet, but by the early 1840s, the cost of lumber in San Francisco had risen to over $200 per thousand board feet (Carranco and Labbe 1975:11). Although lumber reached local markets prior to the mid-1840s, the introduction of steam to sawmills was essentially the beginning of the lumber industry (Koch 1979:461).

From the middle of the 1840s to 1868, a period of less than 30 years, the number of sawmills in California had risen from a handful to 412, with a joint capacity of producing over 500,000,000 board feet annually. San Francisco alone, in 1866, received over 140 million board feet of pine and redwood and about 47 million laths and shingles. Of the 412 (sic) mills

reported in 1868, 197 were driven by water and 217 were powered by steam (Cronise 1868:617). The lumber industry had developed a strong foothold in California, including Fresno and Tulare counties. By 1891, the lumber industry in Fresno County was third in manufacturing, only surpassed by agriculture and mining (Thompson 1891:16). As Barton put it, "the history of the lumber business is identical with that of the country. The progress of one is essential to the prosperity of the other" (1907:1).

The area surrounding today's Hume Lake Ranger District attracted the attention of these loggers as early as 1854, and the timber industry soon grew, becoming one of the most important early industries not only in the development of Fresno and Tulare counties, but the State as a whole. The timber to come out of the southern Sierras in the middle 1800s has been referred to as central California's "first merchantable wealth" (Winchell 1933:16). The enormous virgin forests of California were finally being viewed as a marketable resource, and it was not long before the lumber industry spread throughout the entire State.

The first lumber mill in northern Tulare County was constructed and operated in 1856 by Smith and Hatch near present-day Miramonte (Elliot 1883:157). The following years, as noted above, were characterized by sawmills in this area changing hands, names, owners, and locations very often -- so often, in fact, that the accounts of this area during this period are often disorganized and confusing; in attempting to follow their movements, "the identity of a mill often becomes a baffling question, more a matter of opinion than of fact" (Stanger 1967:4). Apparently, it was cheaper and more efficient to set up new mills in new locations rather than haul logs over primitive roads and trails for longer distances

(Johnston 1968:24). Thus, a thorough compilation of data pertaining to this industry reveals quite a lengthy and sometimes confusing account.

In 1857, J.H. Thomas bought the original Smith and Hatch mill and refitted it with a steam engine. Thomas operated his mill for about five years, at which time he built a new mill and equipped it with a double-circular saw. This new mill was soon washed away in the great flood of 1862.

Soon after the 1862 flood, Bostwick and Ritchie set up a mill at Shingle Flat, which later became known as the "People's Mill"; according to McGee, the "machinery for this mill was freighted by oxen and wagon to Visalia and originally came around Cape Horn" (1952:1). This mill was later purchased at a sheriff's sale in 1864 by J.H. Thomas. The hauling and transportation of lumber during Thomas's operation at this location was done solely by bull teams (McGee 1952:1). Thomas's mill was later purchased in the 1870s by S. Sweet and Company.

Another mill, the "Forest Mill," soon appeared. The Forest Mill was owned and operated by Jaspar Harrell, S.B. Corderoy, and R.A. West and utilized a 62-inch circular saw which was powered by water from a 26-foot overshot wheel (Elliot 1883:157). In 1865, the Forest Mill produced between 300,000 and 400,000 board feet of lumber. On Christmas night of 1867, the Forest Mill was destroyed by a landslide; however, the owners soon moved to higher ground and rebuilt (Elliot 1883:157).

S. Sweet and Company, owners of the People's Mill, sold it to Smith Comstock in 1883, who in turn moved the mill to "Big Stump," an area near the main entrance of the present-day General Grant Park. There he had a long and successful lumbering operation, logging sugar pine,

yellow pine, and redwoods (Tulare County Historical Society 1950). In 1891, Comstock's mill was supplying about 3 million board feet of lumber annually (Thompson 1891:16). Numerous other mills were erected in the area, and they also appear to have moved about frequently.

A detailed account of these logging concerns in northern Tulare County area is presented by Elliot (1883:157-158), so it need not be exhaustively recounted here. In addition to these mills, other logging operations were being carried out further south along the Tule River. The mills of this area were beset with the same problems as the northern mills; detailed accounts of their operations are treated by various authors (Elliot 1883; McGee 1952; Otter 1963; Stiner 1934; Tulare County Historical Society 1950).

The first sawmill in Fresno County was erected 15 miles east of Millerton, then the county seat, in 1854 by Alexander Ball in an area variously known as Ball Meadow, Corlew Meadow, Snow's Meadow, and Meadow Lake (Elliot 1882:88). The following year, Ball contracted with James Fischer to cut 2 million feet of sawlogs to be transported to the valley. In 1856, Ball and Fischer proceeded to build a crude road of about three miles from the mill down to the valley (Winchell 1933:49). In fact, the first roads in this area are credited to the lumbermen who required a means to get the timber out of the woods and into the local markets in the valley (Walker 1971:1). Fischer charged $30 per thousand board feet to haul lumber to the valley, with each load consisting of approximately 3,000 feet. Ultimately, as so often happened with mills at this time, Ball's mill burned down in 1859 and left the people of this area without a convenient lumber source (Winchell 1933:50).

Later that same year, George Sharpton and Charles Converse, attempting to alleviate the problem, built a mill (apparently a whip-saw mill) on the North Fork of the San Joaquin River which put out roughly 5,000 to 6,000 board feet per day. Hauling of timber at this time was done exclusively with oxen. Sharpton's and Converse's "main track ran from Crane Valley by way of Fine Gold Gulch and Cottonwood Creek bottoms to the San Joaquin river..." (Winchell 1933:50). Also in 1859, George McCullough erected a sawmill in the same general vicinity, but his was a waterpowered mill with a larger output; it operated until 1872 (Elliot 1882:88; Winchell 1933:50). More intensive accounts are given for the lumbering ventures of this area immediately to the north of the Hume Lake Ranger District by Elliot (1882); Thompson (1891); Berry (1915); Winchell (1933); Hurt (1941); and Andrews (1958).

This brief outline of the lumbering in Fresno and Tulare counties is incomplete and is only intended to illustrate that this industry developed early and intensively in the southern Sierra region. In summary, the first mills initially rose in response to a small local demand for lumber and thus served very localized markets. Initially they were rather crude operations, evolving to incorporate water -- then steam -- as their primary power sources; as technology improved, productive output increased accordingly. Most of these early mills were owned by individuals or by small partnerships, operating with minimal capital and a small labor force. They usually focused their attention on the sugar pine or yellow pine, and only logged those redwoods that were in their way. Nestled between the two locations outlined, however, was a region of relatively dense and continuous redwood trees and soon these Big Trees became

victim to the logger's axe. In fact, some of the most intensive logging to occur in the Sierras took place in these groves. It is to this area, now encompassed by the Hume Lake Ranger District of the Sequoia National Forest, that we now turn.

Chapter 4

CHRONOLOGY OF HISTORIC REDWOOD LOGGING

Introduction

As noted in chapter 3, the area of the southern Sierras attracted lumbering concerns as early as 1854. Within two decades, men and their sawmills were becoming established within the confines of the present-day Hume Lake Ranger District. According to a map compiled by Paul Spivey, primarily based on oral interviews, no less than 35 sawmills -- operating over a 60-year time span -- have been located within the District at one time or another. Three additional sawmills were situated close by.

As can be seen from map 5, many of these mills clustered in the southwestern leg of the District, below Sequoia Lake. These were the early operations of the area, concerned mostly with logging trees other than the redwoods. Some of the Big Trees were felled, but this was the exception rather than the rule. The exact chronology of these early mills necessarily suffers due to the sporadic nature of early lumbering, as well as to the scant attention given these smaller operations. The only major research on lumbering for this area has been concerned with the large-scale logging activities that commenced in the late 1880s. In fact, the major work to date for this area devoted only one paragraph to the operations prior to 1888 (Johnston 1966:18). As a result, the history of the early phase of lumbering in this region is very poorly known. The description to follow for this early phase is primarily taken from Paul Spivey's notes located at the Bancroft Library. It must be stressed, therefore, that this account is general in nature

and incomplete.

The chronology of these logging activities has been divided into three phases based primarily upon temporal, geographical, and technological criteria, as well as on capital investment. No sharp dividing lines can be drawn among these phases, as certain overlaps occur within each dimension. Activities associated within each phase are described below. This descriptive sketch serves as an important and essential framework, from which the site typology for the surviving remains of these activities was developed.

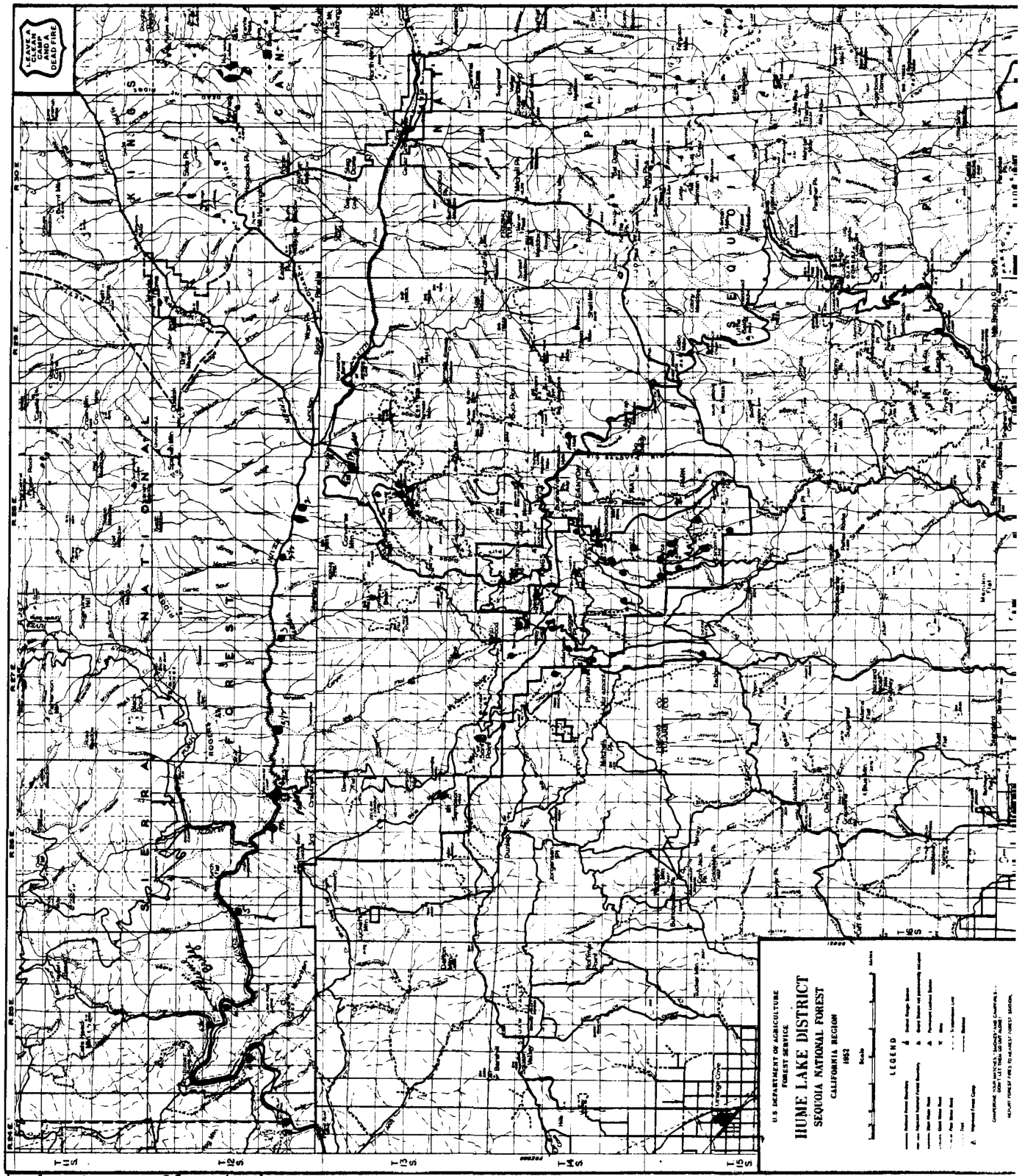
Phase I

For the purposes of this report, Phase I includes the earliest sawmills that are known to have existed within the Hume Lake Ranger District. The dates of operation of these mills range from the early 1870s to 1888. Mills during this period were usually owned by individuals or small partnerships, and they occupied a relatively homogeneous geographical area. This type of sawmill operation was not necessarily restricted to this temporal period or geographical area but was, for the most part, a pre-1900 occurrence. A major criterion for identifying Phase I mills is the amount of capital the owner or investor had available; in general, investments were minor and the operations were small. In addition, these mills were technologically primitive, compared with the mills soon to follow. These technologies were not restricted to a single type, but they did generally represent low-level stages within the evolution of the sawmill.

Among these early technologies was the Mulay Mill, identical to the early whip-saw mill described in chapter 3, in that a vertical blade

Map 5

Sawmill and Flume Stations within the Hume Lake Ranger District



(Paul Spivey Collection)

(Courtesy, the Bancroft Librar

was used to cut a log situated over a pit. The Mulay mills, however, used water power, not human power. Barton built a small dam across Dry Creek in order to have a steady supply of water to power his mill. These early mills, of necessity, were located next to a moving water source. The operators concentrated on the timber in the immediate area; when the timber supply was depleted, they moved the mill up or down the stream, where a new stand of trees was within easy reach.

During the Phase I stage of logging the felling of trees was done almost exclusively with the axe (Bryant 1913). Cutting of the large redwoods in this region was done almost exclusively with the double-bitted type of axe, while trees of smaller stature, such as pine or fir, could be tackled with the single-bitted axe.

Another method of felling giant redwoods early after their discovery, perhaps limited to inexperienced loggers of the time, was to bore holes around the entire trunk with a long auger. Wedges were then driven into the tree in strategically placed locations until the tree toppled. The first redwood felled was taken by this method (Johnston 1966:17-18). This tree was to be displayed to the public -- not used for lumber. This method was not efficient enough for commercial concerns, as it took five men 22 days to accomplish the feat. Using the axe, loggers could cut the time down to about eight days for an average Sierra redwood.

Bryant (1913:93) noted that wedges cannot be used when felling a tree with an axe. The use of an axe wastes 10 to 20 board feet in felling a tree such as a spruce and would waste much more for the larger redwoods. With the use of wedges, the direction of the fall was much more controllable and predictable, and thus much waste was avoided. This savings

in timber, however, could not offset the greater labor requirements involved in using the wedges. Many types of wedges existed and each varied according to specific tasks. In addition to directing the fall, wedges were also used in conjunction with cross-cut saws to prevent the blade from binding.

One of the first sawmills located within the project area was a "Mulay Mill" erected along Dry Creek, near Cedar Springs, sometime in the early 1870s. This mill, owned by Barton, was operated throughout the 1870s (Spivey Collection). Exactly when this mill terminated its production is not recorded.

Two other mills in this area were in operation during the early 1870s. One, the Hyde Mill, was situated near today's Whitaker Forest and may have been the first mill at which Sequoias were logged (Barton 1933). The other, the Woody and Maple Mill, was situated near an area known as Kramer's Place. Whether or not these mills were also Mulay mills was not reported, but their early occurrence in this area suggests that they may have been.

Another logging operation appeared in this area in 1883, when Smith Comstock bought the mill owned by S. Sweet and Company, situated at that time near Happy Gap; Comstock soon moved it to the Big Stump Grove area. Apparently, the mill moved up and down the stream a few times, but all accounts stop short as to how this mill was powered (Tulare County Historical Society 1950; Andrews 1958). The Comstock operation logged some of the finest stands of sugar pine in the area, as well as yellow pine, fir, and redwood. Most accounts give this operation a six-year time span (1883-1889), however, Thompson (1891:16) reported that the Comstock mill had an annual output of 3 million board feet in 1891.

In 1890, Charlie Neff, who had worked for Smith Comstock, erected a sawmill near Cedarbrook. It has been referred to as the "Upper Mill Creek" mill. In 1898, the Upper McKenzie mill was started and ran for about one year, all of the timber logged was sent to the large mill at Millwood to be sawed. The Upper McKenzie mill was later moved to Mill Creek Canyon in 1900 and ran here until 1904. Later, in 1905, the Lower McKenzie mill was erected at the confluence of Mill Flat Creek and Goodmill Creek. It sold its timber to the Hume-Bennett Lumber Company, who in turn shipped it to Sanger by flume. This mill operated until 1914, at which time it went broke.

In 1900, a mill was erected by Hart and Barton on the northern edge of Pierce Meadow. In the same year, a string of mills built and operated by Bill Hart began to appear. The first sawmill was built in Pierce Meadow. In 1902, Hart built a double circular sawmill on Eschom Creek below Hartland. Besides the adaptation of steam to sawmilling, the circular saw was one of the "greatest changes to sawmilling" yet introduced (Stanger 1967:137). The circular saw was first introduced in California during the 1860s and was considered, at that time, to be a "radical innovation" (Stanger 1967:137). Many innovations were rather slow in coming to California; the circular saw had been patented in 1777 by Samuel Miller in England. After it reached the United States in 1812, Eastman and Jacquith from Brunswick, Maine, introduced an improved version and were issued a patent in 1820. The greatest advantage of the circular saw was its speed (Koch 1979:8).

Hart's double circular sawmill ran for about one year and had an average daily output of 15,000 board feet. A few years after he sold the Eschom Creek mill, Hart erected a single circular saw and steam mill

on Dry Creek. As with his other mills, transportation and moving of the logs was done here by bull teams. This mill ran for a number of years and was eventually sold to Charlie Neff in 1914. Neff immediately moved the mill to an area near present-day Pinehurst, where he operated it for about five years. He then sold it to Gus Anderson in 1919, who moved it into the Hume Lake area. The last Hart mill was located on the upper edge of Hartland and operated from 1913 to 1917. This mill was then purchased by Dave Wortman, who moved it to the east side of Pierce Valley. During Wortman's operation, the mill was equipped with steam and a circular saw.

In 1906, Neff constructed another mill near present-day Badger. This mill also had a steam/single circular saw. Neff's last mill was erected in 1908 near Pinehurst and ran until 1912.

Commencing in 1911, Cortner erected and owned six sawmills in the span of less than 20 years. His first mill, a steam/circular sawmill, was on Pierce Creek below Eschom Point. His second mill, built around 1915, was located on the east side of Eschom Point; and in 1917, he constructed a mill on Redwood Mountain, also a steam/circular sawmill. In 1925, Cortner erected a mill near the "Old Dunn (?) Place," and in 1930 he erected a mill in an area known as Rabbit Meadow, near present-day Big Meadows. His last mill was erected about 1935 near an area known as Black Forest.

Dave Wortman, who had earlier purchased a mill from Hart, built a new one on Redwood Mountain about 1925. This mill was equipped with a 64" double circular saw and steam. Some of the equipment used in constructing this mill was purchased from the second Hume mill, located to the north. It is also stated that redwood (most likely downed timber)

was milled here (Spivey Collection).

Seven other mills are referenced in Spivey's notes for this area. Their mode of operation, dates of operation, and location are not well documented. These mills were: (1) Garton sawmill, operating during the 1920s; (2) the Bob Hill mill, located on Lower Pierce Creek; (3) the Stokes sawmill; (4) the Comstock Mill on Upper 69, near Happy Gap; (5) the John River (Riner?) sawmill, located on Milk Ranch Creek; (6) the sawmill below Eschom, and (7) the sawmill erected in Long Meadow near Hume Lake.

In summary, Phase I operations were characterized by small mills, usually owned by individuals, situated near natural water sources. Whether they were water powered or steam powered, water was essential to their operation. The operation of the mills of this phase were concerned primarily with the timber within a relatively close area, and when these trees were felled, the mill and other equipment were moved to a new location. Most of the operations of this phase did not log redwoods; a few did, namely the Smith Comstock mill at Big Stump, the Smith Comstock mill near Happy Gap, and the Wortman mill located on Redwood Mountain.

Most of the felling and bucking of trees during this phase was achieved through manpower. Figure 1b illustrates some of the equipment used in the early phase of logging. No field camps were needed, as it was easier to move the mill to the trees than to transport the logs for any distance. The transportation of logs to the valley for this early phase of logging was done entirely by bull teams. The bull teams would either pull the log along the ground, creating a skidway in the terrain (figure 9a), or the loggers would build a skid road out of lumber, creating a more permanent fixture (figure 1a). Table 3 lists the 31 Phase I

mills located on the map compiled by Paul Spivey, giving their name, mode of operation, period of operation, and general location. (Table 6 in chapter 5 presents the types of sites likely to be associated with logging and lumbering activities of this phase).

TABLE 3

List of Phase I Mills of the Hume Lake Ranger District

	Name	Mode of Operation	Dates	General Location
1.	Barton Mill	Mulay	1870s	Dry Creek, near Cedar Springs T14S, R28E, Sec 30
2.	Hyde Mill	?	1870s	Whitaker Forest T14S, R28E, Sec 15
3.	Woody and Maple	?	1870s	Kramer's Place (?)
4.	Comstock Mill	?	1883-89/91?	Big Stump Grove T14S, R28E, Sec 7
5.	Neff Mill	?	1890	Cedarbrook T14S, R27E, Sec 14
6.	Neff Mill	single circular-saw (steam)	1906	Badger T15S, R27E, Sec 11
7.	Neff Mill	?	1908-1912	Pinehurst T14S, R27E, Sec 22
8.	Neff Mill	?	1914-1919	Pinehurst (sold to G. Anderson) T14S, R27E, Sec 23
9.	Upper McKenzie	?	1898-1899	McKenzie Ridge T14S, R27E, Sec 2
10.	Lower McKenzie	?	1905-1914	Mill Flat Creek at Goodmill Creek T13S, R28E, Sec 22
11.	Hart Mill	?	1900	Pierce Meadow T15S, R28E, Sec 4
12.	Hart Mill	double circular-saw (steam)	1902	Below Hartland T15S, R28E, Sec 5

TABLE 3 (CONT)

	Name	Mode of Operation	Dates	General Location
13.	Hart Mill	single circular-saw (steam)	1905-1914	Dry Creek T14S, R28E, Sec 17
14.	Hart Mill	?	1913-1917	Upper edge of Hartland T14S, R28E, Sec 32
15.	Cortner	circular steam	1911-1912	Below Eschom Point
16.	Cortner	circular steam	1915	East of Eschom Point T15S, R28E, Sec 9
17.	Cortner	circular steam	1917	Redwood Mountain T14S, R28E, Sec ?
18.	Cortner	circular steam	1930	Rabbit Meadows T14S, R28E, Sec 18
19.	Cortner	?	1935	Black Forest T13S, R28E, Sec 11
20.	Cortner	circular steam	1925	Old Dunn Place (?)
21.	Anderson (Gus)	?	1919-?	Hume Lake T13S, R28E, Sec 14
22.	Wortman	circular steam	1917	East of Pierce Valley T15S, R28E, Sec 4
23.	Wortman	double circular-saw (steam)	1925	Redwood Mountain T14S, R28E, Sec ?
24.	Hart and Barton	?	1900-1901	Upper edge of Pierce Meadow T14S, R28E, Sec 33

TABLE 3 (CONT)

	Name	Mode of Operation	Dates	General Location
25.	Garton Mill	?	1920s	?
26.	Stokes Mill	?	?	?
27.	Comstock Mill (on Upper 69)	?	?	Happy Gap T14S, R27E, Sec 12
28.	Bob Hill Mill	?	?	Lower Pierce Creek T15S, R28E, Sec 10
29.	John River (Riner?) sawmill	?	?	Milk Ranch Creek T14S, R27E, Sec 15 (or 10?)
30.	Sawmill below Eschom	?	?	Below Eschom ?
31.	Sawmill in Long Meadow	?	?	Hume Lake area T13S, R28E, Sec 15

Phase II

The second phase of lumbering in the Hume Lake Ranger District is reserved here for the first large-scale logging operations to enter this region. They were also the first operations to log the Sierra redwood with any severe impact. The brief descriptive account to follow is taken primarily from two sources: Johnston (1966) and the Paul Spivey Collection filed at the Bancroft Library, U.C. Berkeley. Other references also allude to these operations, but they are more general accounts concerned with both the Sierra and the Coast redwood (e.g., Andrews 1958). Again, the major criteria for placing the two operations of this phase together is that of capital investment and the fact that they were essentially owned by the same individuals; the temporal span and geographical area encompassed by these operations is also better defined and delimited than that of the previous phase.

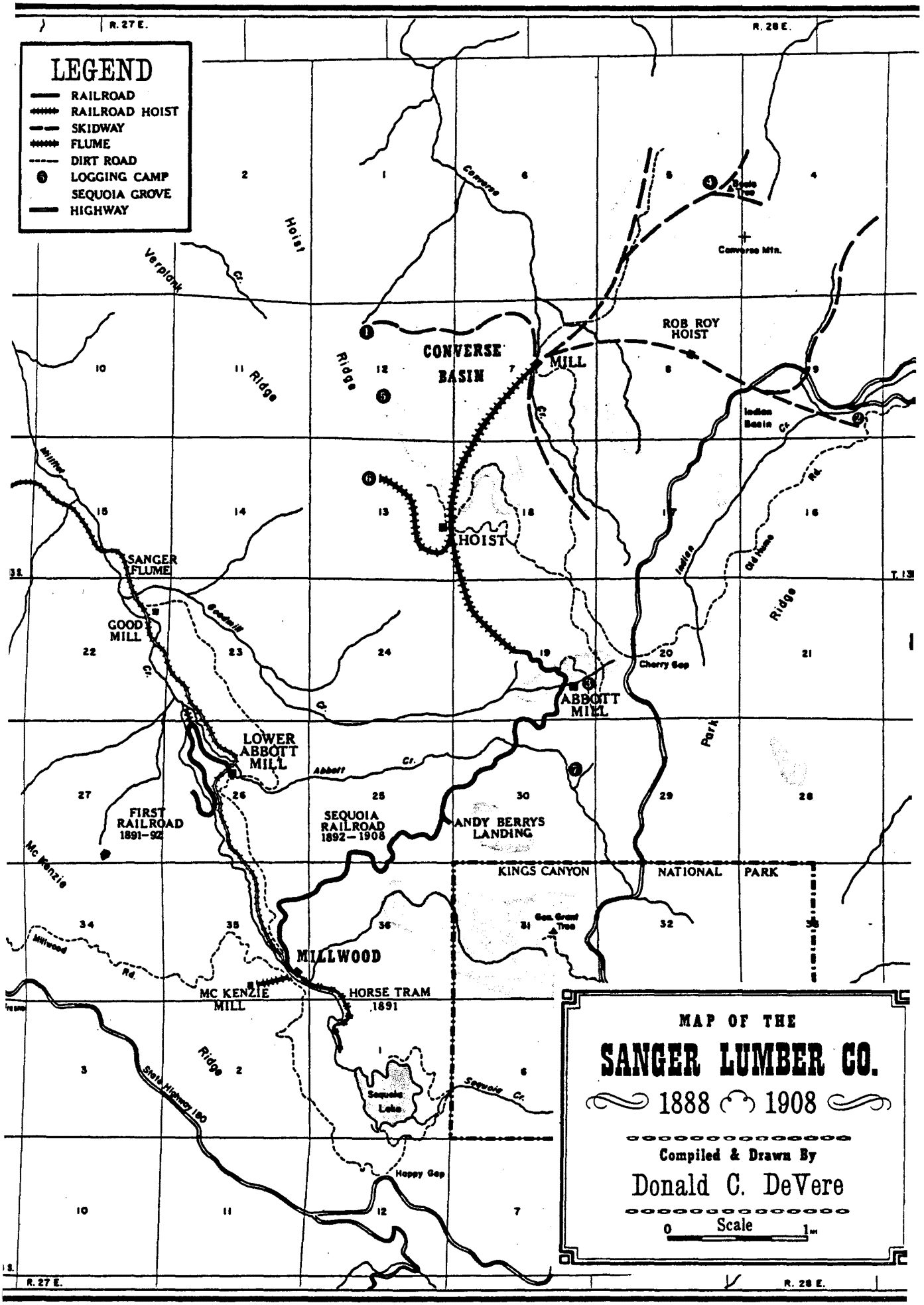
Established in 1888, the initial lumbering organization was known as the "Kings River Lumber Company" and was headed by Hiram C. Smith, president, and Austin D. Moore, vice-president. It operated until 1894, at which time it went out of business due to the severe depression of 1893. The following year, Moore, Smith, and others raised enough money to establish a new company and commenced operations under the new title, "The Sanger Lumber Company." Various problems threatened this new operation, and it too appeared as if it would go broke. After two seasons of heavy losses (1894-1895), the holders of the mortgage notes took over and assumed control of the company. Moore retired at this point, but Smith talked the new owners into one last desperate move. This operation, lasting from 1896 to 1905, was to fail eventually, but it was responsible for what has been termed as the most destructive logging of the Sierra

redwoods ever to have taken place in the Sierra Nevada. Eventually, the holdings of this operation were sold to eastern lumbermen, at which point Phase III in the Hume Lake Ranger District began.

The geographical and spatial patterning of this operation, as well as the mill sites, flume and railroad locations, skidways, chutes, and field camps, are nicely illustrated on a map drawn by Donald C. DeVere entitled, "Map of the Sanger Lumber Company" and initially presented in *They Felled the Redwoods* (Johnston 1966). It shows both the Kings River Company and The Sanger Lumber Company operations combined. The map appears here courtesy of the artist (map 6).

In 1876, an act was passed to aid settlers and miners entitled, "The Timber and Stone Act of June 3, 1876." Under this act, individuals could purchase up to 160 acres of land for a minimum payment of $2.50 per acre. The land purchasable under this act had to be surveyed, it had to be unoccupied, and it had to be mainly suitable for its timber or stone resources and, therefore, unsuitable for homesteading. The expressed purpose of this act was not accomplished, and soon "great tracts of forest lands in California were obtained fraudulently by lumber companies" under this provision (Robinson 1948:172). Although he does not give the names of the fraudulent lumber companies, Robinson may have been referring to the beginnings of the large-scale lumbering operation to log in this area, as land was indeed acquired illegally in this manner.

Apparently, Smith and Moore had imported many "locators" from throughout the state to travel to the Kings River area and file for specific 160-acre quarter sections. The locators were usually given


LEGEND
RAILROAD
RAILROAD HOIST
SKIDWAY
FLUME
DIRT ROAD
LOGGING CAMP
SEQUOIA GROVE
HIGHWAY
R. 27 E.
R. 28 E.
CONVERSE BASIN
MILL
ROB ROY HOIST
HOIST
SANGER FLUME
GOOD MILL
ABBOTT MILL
LOWER ABBOTT MILL
FIRST RAILROAD 1891-92
SEQUOIA RAILROAD 1892-1908
ANDY BERRYS LANDING
KINGS CANYON
NATIONAL
PARK
MILLWOOD
MC KENZIE MILL
HORSE TRAM 1891
Converse Mtn.
Cherry Gap
Happy Gap
Sequoia Lake
Gen. Grant Tree
Converse
Hoist
Verplank Cr.
Ridge
Indian Basin
Cr.
Rd.
Abbott Cr.
Sequoia Cr.
Park
Mc Kenzie
Millwood Rd.
State Highway 180
MAP OF THE
SANGER LUMBER CO.
1888 1908
Compiled & Drawn By
Donald C. DeVere
Scale

(Johnston 19

a small fee, as well as travel expenses, for their trouble. A brief review of the Deed Register of 1888, located at the Recorder's Office in Fresno, shows that the Kings River Lumber Company was the grantee of over 60 quarter sections in the span of a couple of months (Deed Register 1888). Eventually, the Kings River Lumber Company had acquired about 30,000 acres of prime timber land that they could not have obtained otherwise. Soon after they announced plans to log in the area, a representative from Washington D.C. was sent out to investigate accusations of fraud being voiced by the public, but no misdeeds could be proven, and soon the investigation was dropped (Winchell 1933:85).

In 1888, Smith and Moore announced their intention of starting two sawmills in the area of Mill Flat Meadow, about 50 miles east of Fresno. They had planned to run a standard gauge railroad from the valley into the mountains to bring out the timber, but due to the extreme ruggedness of the area, this idea was soon dropped. Consequently, they decided to ship the lumber from the mountains to the valley via a V-shaped flume. Lumber shipped in the flume was rough-cut in the mountain mills and would be finished by the large operation soon to be constructed in Sanger.

The first flume for transporting lumber was pioneered by a lumberman in Nevada. Flumes were initially box-shaped, but after many log jams, which caused lumber to jump the sides when new lumber met up with the jam, a V-shaped flume was introduced, which considerably reduced this problem. By the 1880s, flumes were a relatively common transportation feature at logging centers, therefore Smith and Moore had a model to follow. In fact, the longest flume at that time was situated not far to the north, in lands owned and logged by the California Lumber Company.

Along the Smith and Moore flume were various stations where men

lived and worked. Their job, that of "flume herders," was to patrol up and down the flume for a few miles to make sure the lumber was not jamming up and to make minor repairs if necessary. The introduction and use of the flume in this region by the Kings River Lumber Company played a major role in the destruction of the redwoods, as the lumber companies could now reach, log, and ship out timber not previously accessible (Strong n.d.:15).

Once Smith and Moore had decided upon shipping the lumber out by flume, the next decision was where the valley terminus should be located. After much discussion, the newly created town of Sanger offered to donate to the lumber company 65 acres of land, where Smith and Moore could build a large sawmill. In conjunction with this offer, the fact that Sanger had just been selected as a depot for a new branch of the Southern Pacific Railroad connecting Fresno, Sanger, Reedley, Dinuba, and Porterville was enough to convince the two parties that Sanger should become the terminus for their great flume.

Construction of the flume commenced on 29 July 1889 and was completed 13 months and six days later, on 3 September 1890 (Johnston 1966: 30). The construction of the flume consumed over 10 million board feet of lumber; it was 54 miles long; and it cost about $500,000 (Anonymous n.d.a). While the flume was under construction, the two sawmills of the Kings River Lumber Company were completed along Mill Flat Creek. One mill, the Lower Abbott Mill, was built below the snow line, while the other, Millwood Mill (also known as the Sequoia Mill), was built above the snow line (figure 2b; map 6), therefore, during the winter at least the lower mill could still operate giving the company a year round operation. This goal was never achieved. The flume originated

at the Millwood mill, followed Mill Flat Creek to the Lower Abbott Mill, then continued on to Camp 3 at Rancheria Flat; it passed Camp 4 at Cow Flat, continued down to Kings River, crossing near Trimmer Springs, then meandered its way on to Sanger (figures 6a, 8a, and 8b). Upon reaching Sanger, the flume divided (station 11); the pine was chanelled into the left branch and the redwood and cedar was sent into the right branch (Thompson 1891:19).

The upper mill was completed first and started to cut timber on 6 July 1889, while the lower mill, once belonging to Smith Comstock (Andrews 1958:92), began operation a month later, on 26 August (Johnston 1966:26). All of the materials needed to operate these mills, as well as other supplies and foodstuffs, were hauled into the mountains by wagon trains (Canby 1915). It turned out that the company's best customer was itself, as the operation's entire output for the first season went into building the flume and constructing residences, camps, and associated buildings.

In an area close to the upper mill, plans soon developed to build a dam on Mill Flat Creek in order to provide a steady supply of water for the flume and also to serve as a mill pond. According to Johnston (1966:28), a "concrete and stone dam" was begun in August of 1889, but other sources state that "an earthen dam" was constructed (Challacombe 1952:80; Clark 1938:10). All three sources, however, are consistent in mentioning that most of the work was done by Chinese laborers. The new lake was to be stocked with abundant fish and it was hoped that it would become a favorite and successful recreation area.

The construction of facilities at Sanger, begun in April 1890, consisted of a box factory; planing mill; sash, blind, and door factory;

engine house; and a drying yard. The facilities were completed three months later. Soon after completion, over 60 men were employed in various positions in the Sanger drying yards. Poor lumber (knots, splits, etc.) were sent to the box factory, while better grade lumber was sent to the planing mill. Seventy-five men were employed by the box factory in 1891; it was powered by a cable connected to the main shaft. The planing mill, which employed about 25 men, was situated on one side of the main engine house, drawing its power directly from the main shaft. The good lumber coming from this mill was shipped to local and Australian markets. The Australian market claimed a major portion of the Kings River Lumber Company's business, and the company is said to have "maintained several chartered vessels" for this trade (Thompson 1891:19).

The engine house was constructed of brick on a solid cement foundation 10 feet thick; it contained two engines with a combined output of 260 horsepower. Five men were needed to run the engines, which were fueled by sawdust from the adjacent mills and factories (Thompson 1891:19).

The town of Sanger essentially owes its existence to the Kings River Lumber Company and the lumber industry. Prior to this industry, Sanger was little more than a vacant prairie. But during 1890, more than 75 buildings, at a cost surpassing $125,000.00, were erected in Sanger; the population neared 1500, and it was estimated that the population would double by the end of the following year (Thompson 1891:18-19). Sanger was on the move. The timber industry was responsible for its population climbing to over 2000 within a few months, and many enterprises, such as hotels and a newspaper, soon

commenced operation. Most of Sanger's population was drawn from Centerville, a town situated to the north about 5 miles (Winchell 1933:164).

Thus, by 3 September 1890, a little over two years from the incorporation of their company, Smith and Moore had completed two working sawmills and a 54-mile flume through some of the roughest terrain in the Sierras; they had created a steady supply of water by daming Mill Flat Creek which formed "Sequoia Lake;" and they had constructed an immense facility in the town of Sanger. It was indeed a lumbering operation of a size this area had never seen before.

The two sawmills appeared to be running smoothly, and the first season's production (July - December 1889) neared 8 million board feet -- an average of about 45,000 board feet per day per mill (Johnston 1966:28). Most of this lumber, as previously noted, was used for building the flume and associated buildings around the mill. The following year's cut was stored at Millwood until completion of the flume, at which time the lumber was shipped to Sanger. When the lumber arrived at Sanger by flume, it was manually lifted out and sent to various portions of the plant, depending on its condition and type. The lumber was sent to Sanger a few inches longer on each end, so that the rough edges could be planed and finished there; apparently, it was a rough trip down the flume. From Sanger, the lumber was shipped to local markets via the Southern Pacific Railroad. Close to 2 miles of track wound its way through the Sanger yards, facilitating convenient loading (Johnston 1966:40).

Meanwhile, the two mountain mills were employing the help of over 300 men (Thompson 1891:19). An undated time sheet in the Spivey

collection shows that one employee received only $.35 per hour. He worked a total of 273.5 hours in one month -- close to 70 hours per week -- and grossed $95.72. After deductions of $15 for board and $1 for an unstated reason, this individual netted $79.70 for the entire month; less than $.30 per hour!

The initial operations along Mill Flat Creek concentrated mostly on sugar pine and other species located adjacent to the mills and logged very few redwoods. Thus during the first few years of operation, these mills were essentially comparable with Phase I operations, except that the new mills were relatively permanent structures. While the portable Phase I mills could be picked up and moved to new timber sources, the Phase II mills could not and transportation costs became the largest expense for the lumber company at this time. In 1889, over 150 teams of oxen hauled supplies between Visalia and Millwood. Even after the flume was completed, teams continued to carry the finest lumber to the valley. To get to timber further from the mills, two railroads into the forest were soon built. Johnston noted that,

> • from the upper mill south along Mill Flat Creek, a crude tramway made of wooden rails covered with strap-iron, ran to a log landing about a mile away ...and at the lower mill, a steam powered, narrow gauge railroad connected with a little incline and and a landing two miles to the west (1966:40).

This lower railroad utilized a geared Shay locomotive (figure 4b), while the upper mill's track was rather crude, and empty cars were hauled by horse teams up to a landing where pole-chutes converged (figure 4a).

At this time, logs were brought in from the forest by oxen to various landings, either by dragging them along the ground or pulling

them along pole-chutes where the railroad and tramway passed. Here they were loaded into cars and transported back to their respective mills. Associated with the mills of Phase II's initial stage of logging, therefore, were such features and sites as skidways (figure 9a), pole-chutes (figure 6b), railroad grades (figure 10b), tramways (figure 4a), remnants of the mill site (figure 2b), landings, and Sequoia Lake. No mention of field camps except for flume herder stations for this initial stage of lumbering in Phase II was made either by Johnston or Spivey.

Gradually, the area around the upper mill (Sequoia) attracted more and more settlers, and soon a new community started to take hold. By 1894, a road had been built from Sanger to this community known as Millwood, and soon many establishments, such as a shoemaker, photographer, barber, blacksmith, doctor, undertaker, post office, general store, butcher shop, livery stable, saloons, and two hotels, were established. And a mile or so to the south of Millwood developed "a 'red light' district with its own little village" (Johnston 1966:46).

The initial operations centered around Millwood were not sufficiently lucrative for Moore and Smith, and they soon announced intentions of building a railroad to the northeast, where the larger trees (redwoods) were located. The construction of the railroad commenced in 1892 from Millwood, extended 7 miles to the northeast, and reached its destination in 1893 (Johnston 1966:43); much of the labor for this construction was provided by Chinese workers. From the terminus, an incline was built up to the top of Hoist Ridge, where trees in the vicinity could be logged, loaded on cars, let down the hoist, and loaded onto the 7-mile "Sequoia Railroad" for a trip to Millwood.

According to Johnston, this "hoist arrangement marked the first extensive redwood logging for the company" (1966:44).

Initially, two steam donkeys (figure 5a, 5b) served as power atop the ridge. The steam donkey was invented by John Dolbeer in 1882 and was introduced immediately into the logging community. It consisted of a steam powered winch with cable atop two wooden skids. Horses or oxen would pull the cable into the forest where loggers would attach it to a downed log. The steam powered winch would then pull it in. Prior to these steam donkeys, bull teams were used to drag the logs in, but eventually the steam donkey replaced the bull teams in "snaking" the logs from deep in the forest to landings where they were placed on chutes and transported to the mills.

By 1894, the donkeys on Hoist Ridge had been replaced by a more permanent and powerful fixture. The replacement of these donkeys atop Hoist Ridge was done in anticipation of logging the largest of the redwoods yet discovered in the area of Converse Basin. An exhaustive account of the machinery and operation of this hoist arrangement was written by Edmund Norton in an article entitled, "The Famous Sequoia Mills." Pertinent information is presented here:

> The hoist was operated by two J.B. Jardine boilers at locomotive pressure (130 lbs) operating a 350-horsepower Lidgerwood double-cylindered reversible engine, with 18x36 inch cylinders. The eighteen-inch pinion on the shaft is geared to an eighteen-foot spur wheel on a fifteen foot drum, which is eighteen feet long. On this works the cable, 1 1/8 inch thick, 1 1/2 miles long, and weighing 17,000 lbs. An automatic screw device places the cable in position on the drum. A smaller drum, with a lesser cable, to pull cars over the level to either side of the incline, is worked by friction, to which the whole power of the engine

> can be given by pressure upon a lever, which detaches it from the friction.
>
> From here the cars let you down by cable on the opposite side of the range into the valley of Mill creek, on which the mills are situated. This descent is half a mile long, and some five or six hundred feet below the hoisting engine, which is situated at an elevation of about 7,000 feet.
>
> Here you find yourself at the head of a six-mile railroad...(1895:138).

At about the same time as this powerful hoist was being built, the Kings River Lumber Company was in serious trouble. Stemming from the depression of 1893, the company found itself in serious financial difficulties from which it was never to recover, and in July of 1894, operations were shut down (Johnston 1966:49). At this point, the company had two saw-mills along Mill Flat Creek, a 2-mile railroad extending from the lower mill, a 2-mile horse tramway extending south from the upper mill, a 7-mile railroad extending northeast to where the future Abbott Mill (Camp 3) would be located, an incline railroad hoist from this location to the top of Hoist Ridge, a permanent hoist atop this ridge, and various skidways and pole-chutes branching throughout the forest. With such an extensive operation, and over 1 million dollars invested, it is no wonder that Smith and Moore attempted to regroup and incorporate a new company. This they did, and with the help of a few friends and a couple of banks, they incorporated a new business on 15 October 1894 under the name "The Sanger Lumber Company" (Johnston 1966:49).

Immediately following the incorporation of this new company, two seasons of heavy losses in the lumber business caused the company to go broke again, and Smith and Moore essentially lost their company. Moore soon retired, but Smith, in a last ditch effort to salvage the business, proposed to build a new mill in the center of Converse Basin,

where the largest of all the redwoods were located. This new mill, whose equipment came from the two mills previously located on Mill Flat Creek, started cutting in 1897 (figures 3a, 3b). In addition to the new mill, Smith had the incline from Hoist Ridge into Converse Basin constructed. Soon after this new venture commenced, Smith filed bankruptcy, and Frank Boole was hired to replace him as general manager of the Converse Basin mill. The entire Converse Basin operation was beset with problems, due mainly to the size of the redwoods that they were now trying to log.

Boole's first decision was to erect numerous pole-chutes throughout the forest, connecting the main mill with numerous field camps established in and adjacent to the basin. Logs were placed on these chutes and transported to the mills by strategically located steam donkeys. In 1902, a new mill was erected where Camp 3 had been located and became known as the Upper Abbott Mill (map 6, figure 11a). The Rob Roy Hoist was established in 1901 to bring trees out from Indian Basin to the mill.

Soon an agreement was made to sell the company to Ira Bennett. Although the mill in Converse Basin burned to the ground prior to the sale, Bennett, with the financial backing of Thomas Hume of Michigan, bought all the physical assets of The Sanger Lumber Company in 1905. Phase II had just concluded; and during its tenure, one of the largest, densest, and purest stands of redwoods ever known to have existed had been nearly wiped out. A present-day photograph of "Stump Meadow," located in Converse Basin, is offered here as figure 11b. Table 4 lists the sawmills of Phase II. (Table 7 in chapter 5 presents the types of sites likely to be associated with this phase).

List of Phase II Mills of the Hume Lake Ranger District

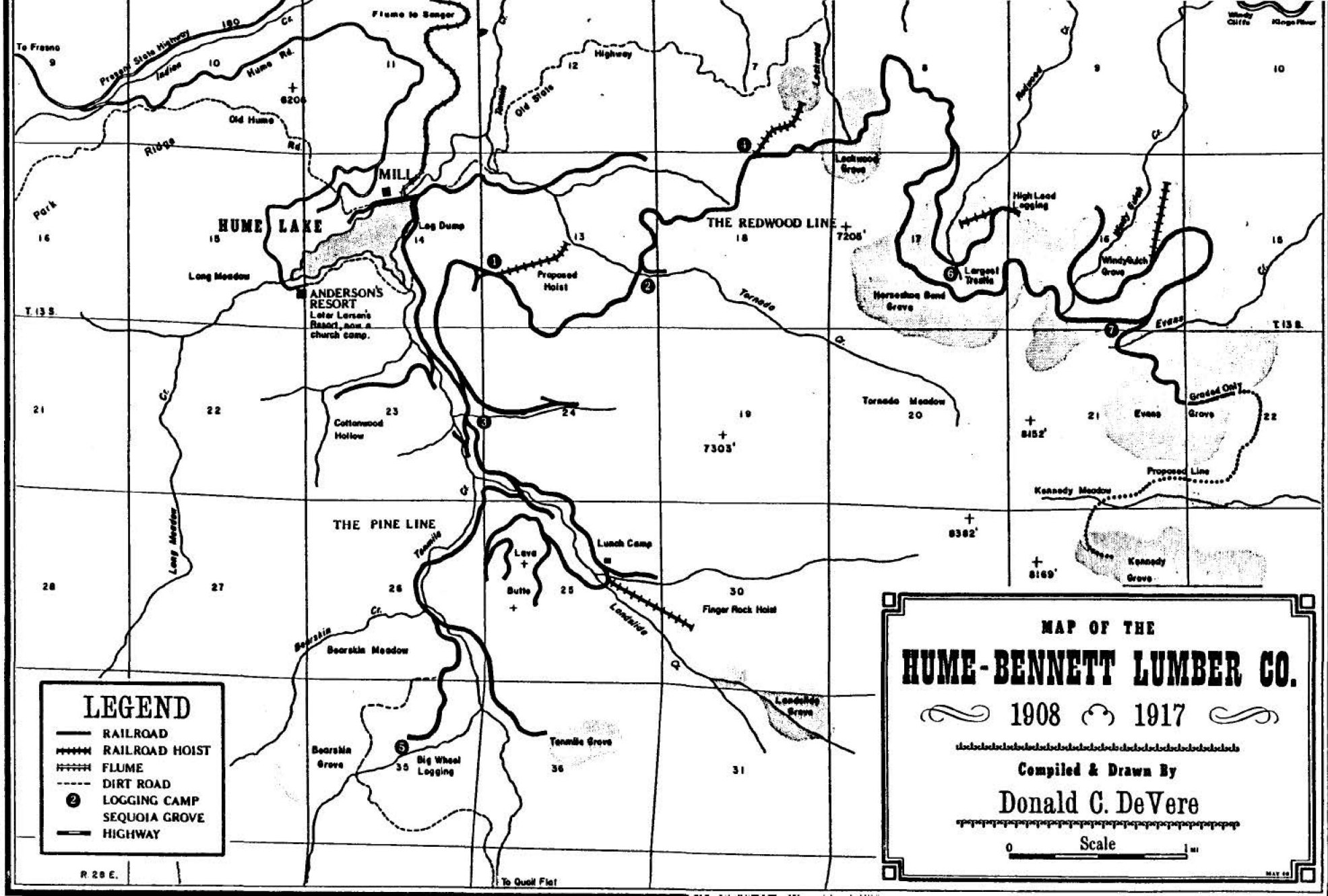
Name	Mode of Operation	Dates	General Location
1. Millwood Mill			
Kings River Lumber Co.	double band-saw	1889-1894	Mill Flat Creek T13S, R27E, Sec 35
The Sanger Lumber Co.	double band-saw	1894-1896	Mill Flat Creek T13S, R27E, Sec 35
2. Lower Abbott Mill			
Kings River Lumber Co.		1889-1894	Mill Flat Creek T13S, R27E, Sec 26
The Sanger Lumber Co.		1894-1896	Mill Flat Creek T13S, R27E, Sec 26
3. Converse Basin Mill			
The Sanger Lumber Co.	double band-saw	1897-1905	Converse Basin T13S, R28E, Sec 7
4. Abbott Mill (Camp 3)		1902-?	Abbott Creek T13S, R28E, Sec 19

Phase III

Phase III is defined in this report as the lumbering operations carried out under the ownership of Thomas A. Hume of Muskegon, Michigan, from 1905 to 1917. The initial operation of this phase was incorporated under the name of The Hume-Bennett Lumber Company in 1905. The name was later changed to the Sanger Lumber Company in 1917, a few years after Ira Bennett, the vice-president, was forced out of the business. A map of these operations, compiled by Donald C. DeVere, is presented here for reference (map 7).

Thomas A. Hume first met Ira Bennett in a lumbering venture in Michigan about 1889. When Bennett approached Hume 16 years later for the financial backing to purchase the assets of The Sanger Lumber Company, Hume agreed, much to his displeasure a few years hence. Prior to the sale, Thomas Hume had requested J.H. Tucker's opinion on the value and condition of the Sanger operation, and Tucker placed the value at about $300,000 (Tucker 1905). While the deal was in the making, the large sawmill at Converse Basin burned down. This did not stop the sale, but the price was adjusted down somewhat.

Hume and Bennett decided to rebuild the Converse Basin mill and log what remaining redwoods were in the area; in July 1906, the mill was ready for operation. A layout of this second sawmill in Converse Basin is offered as figure 3b. It was at this time that the Hume-Bennett Lumber Company constructed a railroad to the east of Hoist Ridge and established Camp 6 (figure 10b). Timber felled in the area of Camp 6 was brought up to the hoist and lowered into the Basin mill. Camp 6, which reportedly employed 80 men, consisted of a landing, two Dolbeer steam donkeys, numerous cabins, a barn, and a cookhouse.



(Johnston 1966)

In Spivey's collection there is an essay derived from an interview with A.M. Cox, the cook at Camp 6 from 1913-1915:

> Lights in the [cookhouse] were kerosene and had to be filled and cleaned often. The range burned wood and had ovens underneath where all the baking was done for the crew. The dining room and kitchen operated everyday so the kitchen crew had no days off. The woods crew worked six days a week but still had to be fed on Sundays. The only meat storage facility was a screened-in room where meat hung. There was no refrigeration. All meals were served family style. Meat and any other supplies came from Hume daily on the railroad. Most of the main meal "entres" (sic) were beef or ham. Mr. Cox noticed that he was having to order too much bacon and after checking discovered that the second cook was using chunks of bacon to help make the "green" wood in the range burn. The second cook was fired and objected to this by threatening Mr. Cox with a butcher knife. There was a five man crew to run the Camp 6 kitchen and dining room and they could feed about 150 people per meal (Spivey Collection).

The Abbott Mill (Camp 3) also resumed operation at this time and received most of its timber by chute and steam donkey from the Camp 7 area. By the end of 1907, the first full year of operation for the new company, it was realized that the area was no longer productive, and plans were made to move the operations to the east about 4 miles. Thus, for two years in the Converse Basin area, the Hume-Bennett Lumber Company had operated two sawmills, one in Converse Basin, and the other along upper Abbott Creek (Camp 3); they had constructed a railroad line from the top of Hoist Ridge, which was again in operation, to Camp 6 where timber awaited loading from a landing constructed of logs; and they had transported logs from Camp 7 along a pole-chute to the Abbott Mill. While much of the geographical location for this initial stage of Phase III overlaps with Phase II, the new facilities constructed, such as the new mill in Converse Basin, Camp 6, the Camp 6 railroad hoist, and a

pole-chute from Camp 7 to the Abbott Mill, were actually associated with the third phase of lumbering.

Soon after a new site to the east was chosen, plans for the erection of a large dam were developed. The first major task in moving was to build a road from the Converse Mill area to their new mill site. After much arduous work, the road reached the confluence of Tenmile Creek and Long Meadow Creek -- the site of the new mill and dam -- and in 1908 construction began. The route of the old Hume road is illustrated on maps 7 and 8.

The dam built at Hume was the first multiple-arch dam built in the United States. Apparently, John Eastwood, the engineer, was the fourth choice after several proposals and bids were reviewed (Spivey Collection), but after much deliberation, Eastwood was selected to build his new and innovative dam. The design of Eastwood's dam was revolutionary and attracted the attention of engineers worldwide. Eastwood's theory was that most dams were too costly due to the amount of concrete necessary to build solid dams. He felt a hollow dam would be cheaper and could, in addition, be better secured, therefore making it stronger. In 1908, construction commenced on both the dam and the new mill. The dam was finished in November, only seven months from its inception, and cost $46,541 (Johnston 1966:103). (A detailed list of the materials purchased for construction of the dam is contained in the Hackley-Hume papers). Soon the mill was also completed and began actual operation in 1909. A flume was extended down Tenmile Creek to the Kings River; it then followed the river until it met up with the original Smith and Moore flume. The new 17-mile extension, which cost about $100,000, had five new herder

stations erected along the way, making a total of 17. At the same time, the construction of a railroad east of the lake was also in progress.

The mill erected at Hume Lake was the largest yet built in the area; it had two band saws, 54 feet long and 12 inches wide. Soon a small community began to develop around the lake, and the town of Hume was eventually established. Associated with the mill was an engine house, machine shop, and foundry; the flume leading to Sanger; a power house, boiler house, and drying kilns; a dining room, warehouse, store, and post office; a small hospital and barber ship; and separate quarters for single and married men. In addition, a guest house was erected alongside the lake next to Hume's residence.

A concise and informative description of the mill's operation was written in a short essay by Paul Spivey, who gathered his information from oral sources who are no longer living. Due to its inaccessibility, it is presented here:

> A three story wooden building housed the Hume Sawmill. The bottom floor had among other things a long line shaft that ran from end to end of the building with belts running from it up to the machinery on the second floor. This line shaft was turned by a 24 inch wide-three ply-135 foot long leather belt which came from the big steam engine in the engine house which was a concrete building right next to to the sawmill.
>
> On the second floor of the mill were two bandsaws - the 'Big Side' with 8 foot wheels and the 'Small Side' which was also a bandsaw...no finish or detail work was done at Hume and the Sanger Mill took care of this. The Hume Mill cut about 300,000 [board feet] per day with two ten hour shifts.
>
> On the third floor was the sharpening room.
>
> Logs from the mill pond went into the sawmill on a small railroad type car that was pulled by cable. The logs were unloaded in the mills on a landing where they could be moved to the carriage saw. The bigband saw had a blade 54" long and 12" wide

> which ran on wheels 8" in diameter. All the large logs were sawed by the 'Pony Band' saw. Sawed lumber went from both bandsaws to the edger saw and then on into the trimmer saws. From there the lumber was piled on cars and sent into the steam heated dry kiln where it was left for two days to dry so it would float down the flume. The sawed lumber was sorted as to length and each car of lumber that went into the kilns had lumber of all the same length. This was done so that when the cars of lumber came out of the kiln the lumber would be ready to be made up into clamped bundles to be sent down the flume. In other words, the lumber made into a bundle to be shipped in the flume had to be all the same length. All the sawdust and slash from the edger and trimmer was sent through the 'Hog' which chewed the hunks of wood up into shavings which went by endless belt directly to the fire boxes under the boilers (Spivey Collection).

From the main mill, the Hume-Bennett Lumber Company extended their operations into the forest via a narrow-gauge railroad, which was changed to standard gauge in 1913. As the company extended away from the main mill sites, various camps were erected to house the loggers. Dates of these camps' operations are as follows: Camp 1, 1910-1912; Camp 2, 1911-1913; Camp 3, 1912-1913; Camp 4, 1914; Camp 5, 1912-1914; Camp 6 1914-1916; and Camp 7, 1916 (Spivey Collection); all connected to the main mill by the railroad and numerous pole-chutes. During peak production, three 2-ton Shay engines were in use.

After Ira Bennett was discharged in 1912, George A. Hume, son of Thomas A. Hume, came to California to manage the operation. He immediately attempted to upgrade the business, as the operation under Bennett had proven very unproductive and had expended more funds than were received. George Hume brought in seven sets of 'big wheels,' a 'McGiffert loader', and other equipment costing over $13,000. Copies of the shipping manifest for this equipment are located in the Hackley-Hume papers. In addition to these, a larger, relatively permanent, donkey was located

at the head of Finger Rock Hoist, near Landslide Creek, to maneuver the large timber (map 7). Thus, the Hume operations expended most of their energy in the areas directly to the east of the lake (extending up to Camp 2) and to the south of the lake (Camps 3 and 5), at least up to 1912. The new additions incorporated by George Hume seemed to help, as 1912 showed the largest output of lumber yet for the Hume-Bennett operation (27,003,873 board feet). The following two years, however, resulted in heavy losses for the company, as the lumber market took a severe spiral downward, and plans to expand operations further east were developed.

Plans for this eastward expansion were in the making prior to the depression, as plat maps of 1911 show the proposed preliminary route of extending the railroad east into Horseshoe Bend Grove from the area of Camp 4. In 1914, camps 4 and 6 were established, and the company entered the largest redwood groves since leaving Converse Basin. In 1915, the market improved slightly and continued upward in 1916. A hoist built into Lockwood Grove from Camp 4 was powered by the engine which once operated the Rob Roy Hoist, previously situated in Converse Basin. Another hoist was extended near Camp 6 and another north of Camp 7. Only a few years ago, the Forest Service located, collected, and restored two Dolbeer steam donkeys near Camp 7. According to Bruce Waldron, District Ranger at Hume Lake, the area of Camp 7 is noteworthy, as there is evidence of many types of logging represented (personal communication).

In 1917, the Hume-Bennett Lumber Company changed its name to the Sanger Lumber Company. The same year, the United States became actively engaged in World War I, and the labor force at Hume Lake was drastically

reduced, as many workers went off to fight.

On 30 October 1917, the large mill at Hume Lake burned down to the ground. A smaller mill was built a short distance to the south in 1918; however, the enormous operation of logging the redwoods by the Humes' of Michigan was essentially finished.

The physical remains of the company were sold in 1927 to E.M. "Ned" Prescott who operated the small Hume mill, cutting downed timber and logs from the bottom of the lake ("sinkers"). Prescott was a long-time resident and lumber dealer of the Fresno area. His operation, like the other operations in the area, was essentially ruined by the depression of 1929. Eventually, the real property of the Sanger Lumber Company was sold to the Forest Service in 1939, and logging of the redwoods in this area came to a halt.

A list of mills operated by Thomas Hume during Phase III, their mode of operation, and their general location is given in Table 5. (Table 8 in chapter 6 identifies the sites and features likely to be associated with this phase of lumbering).

TABLE 5

List of Phase III Mills of the Hume Lake Ranger District

	Name	Mode of Operation	Dates	General Location
1.	Converse Basin	Double band-saw	1906-1908	Converse Basin T13S, R28E, Sec 7
2.	Abbott Mill		1906-1908	Abbott Creek T13S, R28E, Sec 19
3.	Hume Mill	Double band-saw	1909-1917	Hume Lake T13S, R28E, Sec 14
4.	2nd Hume Mill	circular saw	1918-1927	Hume Lake T13S, R28E, Sec 14

Chapter 5

HISTORIC REDWOOD LOGGING TYPOLOGY

Introduction

A major goal of this study has been the development of an accurate inventory of material remains associated with historic redwood logging within the Hume Lake Ranger District, organized according to the three major phases of logging activity which occurred in the project area. Definition of this inventory is based upon a review of primary and secondary historical sources, including maps, photographs, and informant recollections, and very little field reconnaissance.

It should be stressed that the quality of existing inventory or survey data regarding logging-related resources within the Hume Lake Ranger District is extremely poor. While there are some survey reports and site records on file in the District Office and the headquarters at Porterville which do mention logging-related resources, they are not detailed in their site or artifact descriptions. In addition, locational information is apparently not reliable. As noted in the evaluation of primary sources, however, plats and other records prepared for the Hume-Bennett Lumber Company do provide very detailed locational information. These sources, if obtained from the Michigan State University Archives, would prove invaluable in identifying sites and features on the ground.

Development of the site typology was guided by four basic questions: (1) What types and classes of cultural resources were created by historic logging and lumbering activities? (2) Where are these

various remains located? (3) When were different logging-related sites and features occupied or used? and (4) What is the present condition of these resources? Of these questions, the problems of basic typology and chronological position (questions 1 and 3 above) have been emphasized in this study.

Classification of Logging-related Remains

In addressing the question of site typology, attention has been given to existing classification schemes, both those proposed for historical archaeological sites in general (South 1979) and those suggested for logging-related resources in particular (Rock 1980). The typology which has emerged differs from those already proposed, although, like South's classification (1979:227), it is partially based on levels of functional complexity. A second important attribute of logging-related remains is the temporal duration of activities associated with such operations. In view of these two attributes -- functional complexity and time span -- five categories of logging-related remains can be distinguished: isolated artifacts, locations, linear features, sites, and landscapes.

Isolated Artifacts

Isolated artifacts are individual objects which were used either in specific logging tasks (e.g., tree-felling, hauling) or in support of the labor force (e.g., eating, drinking, clothing). The occurrence of isolated artifacts within the project area may be related to activity areas (locations), but often there is no direct association, because these materials have been removed from their original discard location. Lengths of cable, broken saw blades, bottles, tin cans, and even large machinery

parts are examples of isolated artifacts.

Locations

Locations are areas where specific logging tasks of short duration took place. Lasting a few hours, a day, a week, or perhaps a month, these single-purpose activities may have left behind some physical evidence, such as discarded tools, maintenance equipment, or food containers. Locations are most often associated with the felling and hauling of timber.

Linear Features

Linear features connect locations or temporary activity areas with more permanent sites, such as hoists, temporary camps, field mills, and the mill town. Linear features will differ depending on the specific technology being employed during different phases of logging within the project area; they may include skid trails, pole-chutes, wooden tramways, railroad grades, roads, or flumes.

Sites

This category is reserved here for either the places where several interrelated activities occurred over a long period of time, as part of producing rough-cut or finished lumber from redwood and other logs (e.g., mill towns, field mills), or for places which served as temporary home-bases for the construction and logging crews (e.g., permanent and seasonal camps). Relatively permanent, single-purpose activity areas which occupied strategically placed topographic features (e.g., Hoist Ridge) may also be considered sites, as they were used over a period of many seasons, serving as the major terminal points of linear features constructed to move logs to the mills. Thus, these areas may be distinguished from features on the basis of the length of time they were used, the multiplicity of their uses, and the amount of preparation required to install

different kinds of transportation equipment and machinery.

Landscapes

Landscapes are the collective physical remnants of logging, created by construction of access routes and transportation features, damming of streams, clear-cutting of timber stands, and the subsequent degradation of the environment through natural processes such as erosion. Some historic landscapes created by logging, such as Stump Meadow or the Boole Tree, are visible from the ground or elevated vista points. Others, such as the overall patterning of skid trails, skidways, skidroads, railroad grades, and logging roads, must be viewed through aerial photographs or by airplane.

This typology is presented in tabular form (tables 6, 7, and 8) arranged according to the three phases of logging activity identified in the project area. The tables are based on an approach known as "behavioral chain analysis," originally developed to predict the archaeological correlates of ethnographically documented subsistence and artifact-manufacturing activities (Schiffer 1976). An attempt has been made to reconstruct behavioral chains associated with various logging activities and tasks and to identify the type of physical remains which would have been left behind by these differing logging behavioral chains. It should be stressed, however, that many of the areas logged during the third quarter of the nineteenth century and the first two decades of this century have undergone significant alteration by subsequent clean-up and salvage logging operations. Although it may be possible to more precisely identify some of these past abandonment, recycling, and clean-up activities on the basis of oral historical research, they cannot be accounted for in most cases. As a result, what should have been left behind in many areas will either

not be encountered at the location of original use or will have been removed from the project area altogether.

The tables distinguish between those locations and sites where subsurface evidence should be encountered and those where physical remains of activities would be entirely surface in nature. Subsurface remains are less likely to have been disturbed by subsequent salvage and clean-up, although there is evidence that heavy equipment was employed to "restore" many sites. Known examples of remains are also listed in the tables, as are available locational data and accompanying documentation from primary or secondary sources and photographic collections.

TABLE 6

Typology of Phase I Redwood Logging Remains

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS				
broken, discarded tools; trash, cans bottles, etc.	trail and road construction	Construction/ Logging		
axes, sawblades, augers, wedges, springboards	felling	Logging		
metal peelers, piles of bark	peeling	Logging		
sawblades, broken handles, piles of sawdust	bucking	Logging		
tongs, chains, yokes, cable, hooks, couplers, grease cans, barrel hoops, donkey engine parts, etc.	transport	Skidding (forest to mill)		
broken sawblades, handles, machinery, sawdust piles	sawing, edging, and trimming	Milling		
tongs, chains, yokes cable, hooks, couplers, wooden wheels, wagon parts	transport	Hauling (mill to market)		

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS (Cont)				
bottles, cans, pipes, pottery, discarded or broken tools, clothing	shelter; food preparation; food consumption; waste disposal	Labor/Subsistence		
LOCATIONS				
logged areas	felling	Logging	Comstock Mill area T14S, R28E, Sec 18	USFS site record 05-13-51-110
landings	transport	Skidding/Hauling		
storage areas (near landings and skidways)	storage	Skidding/Hauling/ Milling		
steam donkey locations	transport	Skidding		
LINEAR FEATURES				
crude trails, crude roads	construction	Construction/Logging/ Hauling		
skidways	transport	Skidding		
skidroads	transport	Skidding/Hauling		

TABLE 6 (CONT)

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES				
*permanent landings	storage, transport	Skidding/Hauling		
*mill sites	sawing, edging, trimming	Milling	Comstock Mill T14S, R27E, Sec 12	USFS site record 05-13-51-105 Spivey Collection
			Comstock Mill T14S, R28E, Sec 18	USFS site record 05-13-51-110 Spivey Collection
			Wortman Mill T14S, R28E, Sec 15	USFS site record 05-13-51-106 Spivey Collection
*domestic/residence	shelter, etc.	Labor/Subsistence		
eating areas	food preparation, consumption	Labor/Subsistence		
*privies	waste disposal	Labor/Subsistence		
*trash pits	waste disposal	Labor/Subsistence		
LANDSCAPES				
high stumps	felling	Logging	Comstock Mill area T14S, R27E, Sec 12	personal observatic USFS site record 05-13-51-105
trails, roads, skid-ways, skidroads	construction, transportation	Construction/Skid-ding/Hauling		

Typology of Phase II Redwood Logging Remains

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS				
broken, discarded tools, trash deposits, cans, bottles, etc.	trail, road construction	Construction/ Logging		
axes, sawblades, augers, wedges, springboards	felling	Logging		
metal peelers, piles of bark	peeling	Logging		
sawblades, broken handles, piles of sawdust	bucking	Logging		
tongs, chains, yokes, cable, hooks, grease cans, couplers, barrel hoops, donkey engine parts, etc.	transport	Skidding (forest to mill)		
broken sawblades, handles, machinery, sawdust piles	sawing, edging, trimming	Milling		
tongs, chains, yokes, cable, hooks, wooden wheels, couplers, wagon parts, railroad ties, railroad spikes	transport	Hauling (mill to market)		

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS (Cont)				
bottles, cans, pipes pottery, discarded or broken tools, clothes	shelter; food preparation and consumption; waste disposal	Labor/Subsistence		
LOCATIONS				
logged areas	felling	Logging	area of camp and mill sites (see Sites below and Table 4).	
landings	storage, transport	Skidding/Hauling		
steam donkey locations	transport	Skidding		
storage areas	storage	Hauling	associated with each mill site	
drying areas	storage	Hauling	associated with each mill site	
LINEAR FEATURES				
trails, roads	construction	Construction/Logging/ Hauling		
skidways	transport	Skidding	Indian Basin T13S, R28E, Sec 9	USFS site record 05-13-51-52 Johnston 1966

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
LINEAR FEATURES (Cont)				
skidways (cont)	transport	Skidding	Converse Basin T13S, R27E, Sec 12; T13S, R28E, Sec 4, 5, 7, 8, 18	Johnston 1966
			Millwood area T13S, R27E, Sec 25, 26, 27, 35, 36; T13S, R28E, Sec 19, 30	USFS site record 05-13-51-46
skidroads	transport	Skidding	Converse Basin (Stump Meadow) T13S, R28E, Sec 5	USFS site record 05-13-51-127
pole-chutes	transport	Skidding	Converse Basin (exact location not recorded)	personal observatio (see Figure 9b)
			Verplank Ridge T13S, R27E, Sec 11	USFS site record 05-13-51-39
wooden tramways	transport	Hauling	Millwood area T13S, R27E, Sec ?	USFS site record 05-13-51-133
railroad hoists	transport	Hauling	Converse Basin T13S, R28E, Sec 7, 18	Johnston 1966
			Abbott Mill T13S, R28E, Sec 18, 19	Johnston 1966

TABLE 7 (CONT)

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
LINEAR FEATURES (Cont)				
railroad grades	transport	Hauling	Lower Abbott Mill T13S, R27E, Sec 26	Johnston 1966
			Millwood-Abbott Mill T13S, R27E, Sec 25, 35, 36; T13S, R28E, Sec 19, 30	Johnston 1966
railroad trestles (of Sequoia Railroad: 1892-1908)	transport	Hauling	Millwood area T13S, R27E, Sec 36; T13S, R27E, Sec 25	USFS site record 05-13-51-131 USFS site record 05-13-51-131
flume	transport	Hauling		
SITES				
*landings (permanent)	storage, loading	Skidding/Hauling	Andy Berry's landing T13S, R27E, Sec 25	Johnston 1966
hoists	transport	Hauling	Hoist Ridge T13S, R27E, Sec 13	USFS site record 05-13-51-6 Johnston 1966 Spivey Collection
*field camps	shelter; food preparation and consumption	Logging/Skidding/ Labor/Subsistence	Camp 1 T13S, R27E, Sec 12	Johnston 1966

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*field camps (cont)	shelter; food preparation and consumption	Logging/Skidding/ Labor/Subsistence	Camp 2 T13S, R28E, Sec 9	Johnston 1966
			Camp 3 T13S, R28E, Sec 19	Johnston 1966
			Camp 4 T13S, R28E, Sec 5	Johnston 1966
			Camp 5 T13S, R27E, Sec 12	Johnston 1966
			Camp 7 T13S, R27E, Sec 30	Johnston 1966
*flume stations	herding, shelter, food preparation, food consumption	Herding/Labor/ Subsistence	Station 4 T12S, R26E, Sec 26	Spivey Collection
			Station 4½ T12S, R26E, Sec 27	Spivey Collection
			Station 5 T12S, R26E, Sec 19	Spivey Collection
			Station 6 T12S, R25E, Sec 15	Spivey Collection

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*flume stations (cont)	herding, shelter, food preparation, food consumption	Herding/Labor/ Subsistence	Station 7 T12S, R25E, Sec 20	Spivey Collection
			Station 8 T12S, R25E, Sec 31	Spivey Collection
flume bridge	transport	Hauling	Flume bridge near Trimmer Springs T12S, R25E, Sec 16	Spivey Collection
*mill sites	sawing, edging, trimming, storing	Milling/Labor	Millwood T13S, R27E, Sec 35	USFS site record 05-13-51-5 Johnston 1966 Spivey Collection
			Lower Abbott Mill T13S, R27E, Sec 26	USFS site record 05-13-51-121 Johnston 1966 Spivey Collection
			Converse Basin Mill T13S, R28E, Sec 7	USFS site record 05-13-51-8 Johnston 1966 Spivey Collection
			Abbott Mill (Camp 3) T13S, R28E, Sec 19	USFS site record 05-13-51-123 Johnston 1966 Spivey Collection

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*mill town	shelter, subsistence, labor, entertainment, recreation	Labor/Subsistence Milling/Recreation Entertainment	Millwood T13S, R27E, Sec 35	USFS site record 05-13-51-5 Johnston 1966 Spivey Collection
LANDSCAPES				
stumps	felling	Logging	Stump Meadow (Converse Basin) T13S, R28E, Sec 5	USFS site record 05-13-51-127
			The Chicago Stump T13S, R28E, Sec 18	Johnston 1966 Spivey Collection
The Boole Tree	felling in vicinity	Logging	The Boole Tree (Converse Basin) T13S, R28E, Sec 5	USFS site record 05-13-51-19 Johnston 1966 Spivey Collection
complex of linear features such as: roads, skidways skidroads, chutes railroad hoists, and railroad grades	construction, transport	Construction/Hauling Skidding	Historic Redwood Logging System	USFS aerial photographs; black and white (1940s) Johnston 1966 (maps
Sequoia Lake	storage, recreation	Milling/Recreation	Sequoia Lake T14S, R27E, Sec 1	Spivey Collection

TABLE 8

Typology of Phase III Redwood Logging Remains

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS				
broken, discarded tools; trash deposits cans, bottles, stone walls, etc.	road construction	Construction/ Logging	Old Hume Road T13S, R28E, Sec 16	USFS site record 05-13-51-1
axes, sawblades, augers, wedges, springboards, etc.	felling	Logging	Windy Gulch Logging Artifacts T13S, R29E, Sec 16	USFS site record 05-13-51-4
metal peelers, piles of bark	peeling	Logging		
sawblades, broken handles, augers, piles of sawdust	bucking	Logging		
tongs, chains, yokes cable, hooks, grease cans, couplers, donkey engine parts, Big Wheel machinery, etc.	transport	Skidding (forest to mill)		
broken sawblades, handles, machinery, sawdust piles	sawing, edging, trimming	Milling		
tongs, chains, yokes, cable, hooks, wooden wheels, couplers, wagon parts, railroad ties, railroad spikes, nails, etc.	transport	Hauling (mill to market)		

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
ARTIFACTS (Cont)				
bottles, cans, pottery, pipes, discarded or broken tools, clothing, etc.	shelter; food preparation and consumption; waste disposal	Labor/Subsistence		
LOCATIONS				
logged areas	felling	Logging	area of camp and mill sites (see Sites below and Table 5)	•
landings	storage/transport	Skidding/Hauling		
steam donkey locations	transport	Skidding		
storage areas	storage	Hauling	associated with each mill site	
drying areas	storage	Hauling	associated with each mill site	
LINEAR FEATURES				
trails, roads	construction	Construction/Logging Hauling	Old Hume Road T13S, R28E, Sec 16	USFS site record 05-13-51-1
skidways	transport	Skidding		
skidroads	transport	Skidding		

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
LINEAR FEATURES (Cont)				
railroad hoists	transport	Hauling	Finger Rock Hoist T13S, R28E, Sec 25	Johnston 1966
			Unnamed T13S, R29E, Sec 7	Johnston 1966
			Unnamed T13S, R29E, Sec 16	Johnston 1966
			Unnamed T13S, R29E, Sec 17	Johnston 1966
railroad grades	transport	Hauling	The Pine Line T13S, R28E, Sec 13, 14, 23, 24, 25, 26, 35, 36	Johnston 1966
			The Redwood Line T13S, R28E, Sec 13, 14; T13S, R29E, Sec 15, 16, 17, 18, 21, 7, 8	Johnston 1966
railroad trestles	transport	Hauling	near Evans Creek T13S, R29E, Sec 16	USFS site record 05-13-51-23
			Horseshoe Bend Grove T13S, R29E, Sec 17	Johnston 1966
flume	transport	Hauling		

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES				
*landings (permanent	storage/loading	Skidding/Hauling		
hoists	transport	Hauling	Hoist Ridge T13S, R27E, Sec 13	USFS site record 05-13-51-6 Johnston 1966 Spivey Collection
			Rob Roy Hoist T13S, R28E, Sec 8	USFS site record 05-13-51-9 Johnston 1966 Spivey Collection
*field camps	shelter; food preparation and consumption	Logging/Skidding Labor/Subsistence	Camp 6 T13S, R29E, Sec 13	Johnston 1966 Spivey Collection
			Camp 1 T13S, R28E, Sec 13	USFS site record 05-13-51-124 Johnston 1966 Spivey Collection
			Camp 2 T13S, R28E, Sec 13	Johnston 1966 Spivey Collection
			Camp 3 T13S, R28E, Sec 23, 24	Johnston 1966 Spivey Collection
			Camp 4 T13S, R29E, Sec 7	Johnston 1966 Spivey Collection

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*field camps (cont)	shelter; food preparation and consumption	Logging/Skidding Labor/Subsistence	Camp 5 T13S, R28E, Sec 35	Johnston 1966 Spivey Collection
			Camp 6 T13S, R29E, Sec 17	Johnston 1966 Spivey Collection
			Camp 7 T13S, R29E, Sec 16	Johnston 1966 Spivey Collection
*flume stations	herding, shelter, food preparation, food consumption	Herding/Labor/ Subsistence	Station 2 T12S, R28E, Sec 34	USFS site record 05-13-51-3 Spivey Collection
			Station 2½ T12S, R28E, Sec 29	USFS site record 05-13-51-3
			Station 3 T12S, R27E, Sec 26	Spivey Collection
			Station 3½ T12S, R27E, Sec 29	Spivey Collection
			Station 4 T12S, R26E, Sec 26	Spivey Collection
			Station 4½ T12S, R26E, Sec 27	Spivey Collection
			Station 5 T12S, R26E, Sec 19	Spivey Collection

*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*flume stations (cont)	herding, shelter, food preparation,	Herding/Labor/ Subsistence	Station 6 T12S, R25E, Sec 15	Spivey Collection
			Station 7 T12S, R25E, Sec 20	Spivey Collection
			Station 8 T12S, R25E, Sec 31	Spivey Collection
flume bridge	transport	Hauling	Flume bridge near Trimmer Springs T12S, R25E, Sec 16	Spivey Collection
*mill sites	sawing, edging	Milling/Labor	Converse Basin T13S, R28E, Sec 7	USFS site record 05-13-51-8 Johnston 1966 Spivey Collection
			Abbott Mill (Camp 3) T13S, R28E, Sec 19	USFS site record 05-13-51-123 Johnston 1966 Spivey Collection
			Hume Lake Mill T13S, R28E, Sec 14	Johnston 1966 Spivey Collection
			2nd Hume Mill T13S, R28E, Sec 14	Johnston 1966 Spivey Collection

Chapter 6

SIGNIFICANCE OF REDWOOD LOGGING RESOURCES

Introduction

This section of the report provides specific evaluations regarding the significance of logging-related cultural resources situated within the Hume Lake Ranger District, as this quality may be determined from preliminary archival and oral historical research. Following a general discussion of significance, a research design for the study of redwood logging in the project area and surrounding region is presented. This research design, in conjunction with information regarding the content of primary and secondary historical sources for the area, served as a basis for evaluating the information potential of specific categories of redwood logging remains. Those sites and features which have been identified from preliminary research are discussed in terms of probable information yield, and techniques most appropriate to their investigation are suggested. In addition, evaluations are offered regarding other kinds of significance associated with redwood logging-related remains. Finally, the kinds of additional historical research necessary to precisely identify resources encountered during survey and to refine research questions should data recovery be warranted are described.

Significance as Research Potential

Two basic attributes of logging-related resources will be considered in assessing their informational or research value: (1) the nomothetic potential of these resources, that is, the extent to which they can meaningfully contribute to valid generalizations regarding important historical

and anthropological questions; and (2) the potential for information loss associated with these resources, that is, an estimate of the likelihood that information essential to an understanding of patterns of life in the late nineteenth and early twentieth centuries and the processes of change which altered them would be lost in the event that archaeological data are destroyed without professional study (Brown 1979; Advisory Council 1980).

In this study, a resource will be judged to be high in nomothetic potential if it can be shown that (1) it is "representative" of events, activities, groups of people, or processes which figured prominently in the historical development of the project area and surrounding region, and (2) its data content will, when analyzed in combination with other sources of information, allow for generalizations regarding late nineteenth and early twentieth century technological, economic, and social history and the broader characteristics of logging-related frontier expansion in California and the Far West. Potential for information loss will be said to be great if it can be demonstrated that a particular resource contains data which, after proper interpretation, are essential to the successful investigation of important anthropological and historical questions. In other words, archaeological remains of the historic period are important only if they do more than simply enhance the archaeologist's understanding of his own subject matter. The use of archaeological materials to address purely archaeological problems does not establish their significance in this approach, although knowledge of the kinds of behavior which created the archaeological record, as well as knowledge of various types of artifacts encountered on historical sites, is often necessary for the interpretation of their broader meaning (Schiffer 1972).

It must be shown that archaeological resources will contribute in an essential way to the answering of important substantive research questions, and that, once formed, these answers can be presented to the public in a manner which is both informative and enriching. These distinctions cannot be taken lightly. The handbook on the treatment of archaeological properties recently issued by the Advisory Council on Historic Preservation includes a relevant statement:

> If an archaeological property can be used only to address unimportant questions, or questions that have been or can be better addressed using other sources of information, then the property itself is unimportant from an archaeological standpoint (1980:7).

In view of the above principle, the degree of information loss can be judged only in terms of the research design -- to what extent can each of the research questions be successfully answered without benefit of archaeological data.

Once the important questions have been identified, estimating information loss requires a thorough knowledge of the extant primary historical record, the kinds of evidence contained in surviving documents and personal recollections, and how this evidence may or may not be biased or incomplete. Information loss must also be gauged in terms of a realistic appraisal of the limitations inherent in archaeological data. The fact that the documentary record lacks information about particular types of behavior in the past, or about certain segments of the population, does not automatically confer significance to the archaeological remains identified with those behaviors or individuals. The value of archaeological data depends on what they can, after appropriate analysis, reveal about the questions being asked of these behaviors and population segments not

recorded in traditional historical sources. Paradoxically, the absence of historical documentation and the controlled context it affords often reduces the value of archaeological data for addressing many questions, yet the very existence of certain kinds of historical documentation can render archaeology more or less unnecessary (Finley 1971). It should be clear, therefore, that the task of estimating information loss is by no means an easy one, even when a thorough evaluation of the primary historical record is available and a reasonably specific research design has been prepared.

Many of the problems associated with evaluating historical archaeological data in these terms stem from the basic research approach practiced by historians, archaeologists, and other scholars concerned with historical problems. In spite of much polemic to the contrary, the process of historical and archaeological research is basically inductive in nature: Much of the interpretation representing the best of historical and archaeological scholarship developed out of the need to understand evidence or data which was either new or had not been anticipated prior to the conduct of research. Thus many of the historical studies which incorporate archaeological data may have been initially stimulated and directed by a concern for material remains, but they ultimately have drawn much more heavily from documentary and other historical sources for their interpretation. The value of this discovery process should not be underestimated, but the real contribution of archaeological data must also be recognized. Historic archaeological data most often functions as a stimulus for extensive historical ethnographic reconstruction, resulting in studies in social or economic history very similar to those produced by anthropologically oriented historians who have not had the

benefit of archaeology.

In short, beyond raising the questions that most historians have not thought to ask and introducing an anthropological perspective to the analysis, how important is the analysis of archaeological data from the historic period? Can these archaeological data really contribute meaningfully to answering the questions which have been raised? These are the hard questions that will be considered in evaluating information loss associated with various categories of redwood logging remains. In many cases, they will be difficult to answer fully because of the very preliminary nature of the documentary and oral historical research conducted as part of this overview study.

There are, however, contexts in which potential for information loss associated with specific categories of redwood logging remains can be assessed with some certainty. A major limitation of the conventional historical record, for example, is its lack of information regarding the specific manner in which objects were designed, manipulated, and used within many productive and extractive technologies during the nineteenth century. Reconstructing these technological processes is an important goal of archaeological investigation. As has been noted in a recent study of copper and zinc mining in southern Arizona,

> past industrial documentation has focused on high-level "state of the art" technology, at the expense of lower levels. You will be hard pressed to find instructions on how to cobble a winch drum...or how to fabricate drainage lines of home cast tiles. It is just this sort of information which will be of value to people who want to develop industry depending on human labor and cheap resources. This is the kind of information that archaeology can provide (Teague 1980:19).

The technology of nineteenth century logging is, in part, an ex-

ample of this lower or intermediate level industrial technology; while many aspects of the technology of this industry are well documented in historical sources, the understanding of the application of basic principles of logging and related technology in specific periods within the Hume Lake Ranger District will definitely benefit from analysis of archaeological remains.

In addition, there is often a lack of information about the lives and customary behavior of members of the labor force who participated in these technologies and industries, because, along with many other relatively poor and transient segments of the population, these people are not meaningfully represented in traditional historical sources. In the absence of other information, knowledge of these people and their ways of life must depend on archaeological data, a situation which has given rise to several archaeological studies of industrial workers's communities associated with textile and other factories (Bartovics 1975; Starbuck 1978) and mining (Teague and Schenck 1977; Costello 1980; Deetz 1980; Teague 1980). Although there are many aspects of social and cultural life that are simply not reflected in archaeological data, the material remains of these communities can provide information about the general quality of life, housing, foodways, consumer behavior, and perhaps even ethnicity. In the case of historic redwood logging, workers' communities at Hume, Millwood, and the seasonal field camps may indeed contain archaeological material of this sort. The value of these data, however, depends in part on whether or not discrete trash deposits may be correlated with specific, identifiable groups of people, such as households. If the identity of individuals making up the community is unknown, much of the specific interpretive value of the archaeological

data is lost. Although general conclusions regarding foodways, consumer preferences, and quality of life can be drawn, it may not be possible to examine more refined questions regarding ethnicity, assimilation, and economic adaptation at the household level.

The research design which follows describes the important questions which may benefit from analysis of historic redwood logging remains. The design is based on a research approach which stresses the need to understand the environment and cultural landscape of the project area and particularly the meaning which the public derives from these phenomena. Together with the evaluation of primary and secondary historical sources in chapter 2, the research design serves as the basis for evaluating specific kinds of logging remains.

Research Design

Introduction

The research design for historic redwood logging resources within the Hume Lake Ranger District has been prepared in response to a basic problem: Are landscapes, sites, linear features, locations, and artifacts associated with redwood logging significant according to any or all of the criteria set forth by the National Register of Historic Places? The research design thus serves as the vehicle within the historical overview for (1) explicating and organizing those problem domains which may be fruitfully investigated by the study of redwood logging remains and their environmental setting and (2) identifying the categories of data required for applying National Register criteria to these resources.

It should be pointed out that the following research design presents those broad anthropological and historical questions which may be addres-

sed using an historic archaeological approach to the analysis of historic logging-related remains. These questions were used in guiding the research on the redwood logging remains within the Hume Lake Ranger District, and thus the research design essentially served as a tool for the evaluation of their significance.

Evaluation of Significance

Although archaeologists and historians have identified several types of significance associated with historic and prehistoric archaeological sites (Schiffer and Gummerman 1977; Moratto and Kelly 1978), historic redwood logging remains are evaluated here primarily in terms of the importance of their information yield and their status as relict cultural landscapes. Significance viewed as information potential (criterion (d) of the National Register) has been addressed mainly in terms of "specific problem-oriented research designs" (Raab and Klinger 1977). There are, however, other important considerations to be made in evaluating the significance of redwood logging-related resources. As recently noted by some of the strongest advocates of the research design approach, the other National Register criteria must also be applied in assessing the significance of archaeological resources:

> While they are perhaps not as readily relatable to the use of explicit problem-oriented research designs...each of these criteria (a, b, and c) has a clear potential to be related to the designs that are either site specific or regional in scope (Klinger and Raab 1980:555).

In view of the need to recognize all four of the National Register criteria in evaluating historic redwood logging remains within the Hume Lake Ranger District, the criteria may be integrated as follows:

> The quality of significance in American historical archaeology is present in districts, sites, features, and deposits that possess integrity of location, setting, and association, and that have yielded or may be likely to yield information necessary for a full understanding of and appreciation by the public of the persons, events, and processes that have made a significant contribution to the broad patterns of our history at the local, regional, and national levels.

Combining the National Register criteria in this way has the advantage of explicitly relating the first and fourth criteria. Information content is thus defined in terms of the potential of a resource to yield data regarding broad historical patterns and processes (i.e., nomothetic potential and information loss potential).

Cultural Landscape Values

Consideration of the integrity of setting and place of resources permits the identification of cultural landscape values, i.e., an estimate of the extent to which redwood logging's overall effects on the project area's physical environment are still visible and may directly communicate to the public significant aspects of the cultural heritage of the southern Sierras and provide a feeling of place for an important chapter in the human struggle to gain mastery over the most imposing of environmental obstacles.

In order to incorporate evaluation of landscape values into the research design, the following question directed preparation of the historical overview. What was the connection between cultural perception, technology, economic organization, and the exploitation of timber resources within the project area during the historic period? Answers to this basic question, and to those of a more specific nature derived from or related to it, can be sought through what geographers have

termed the "environmental perception approach" (Grossman 1977). This approach is distinguished by its primary concern for

> the relationship between the real environment, perception of the environment, decision-making, and overt behavior. It is assumed that many environmental and spatial decisions are related to the way people perceive their surroundings and evaluate their environmental images (Grossman 1977:140).

Analysis of environmental perception focuses on the complex relationships between perceptions, values, verbalized attitudes, and behavior. Chief among its objectives is the definition of the cultural landscape, as it has been constituted in the past and as it exists among contemporary populations. The cultural landscape is comprised of a number of interrelated environmental images which are created, elaborated upon, and modified within the context of a particular society (Rowntree and Conkey 1980). An important aspect of reconstructing the cultural landscape is the delineation of behavioral patterns which created its visible or outward form -- namely, patterns of resource utilization, technological developments and implementation, land-modification activities, and settlement pattern.

Such an approach permits an anthropological analysis of the contemporary process of historic preservation itself as it operates within the current land-management programs of the Federal government. This preservation process is also an example of the creation of landscape symbols through the imposition of meaning and value on the environment (Rowntree and Conkey 1980). Although there are frameworks currently available for assessing visual landscape qualities (Litton 1969; Forest Service 1974; Burke 1975), of particular importance is integrating the results of cultural resource studies which recognize the need to identify

and evaluate cultural landscapes with the identification and evaluation of landscape qualities and scenic values required by recently implemented Forest land-management regulations (36 CFR 219.12, i, 6).

The implementation of these approaches within the Hume Lake Ranger District can benefit both from data on landscape alterations which have resulted from redwood logging and from information regarding the process by which the public has incorporated these changes into their environmental images or visual expectations. Such information may be derived from "user-perception" research, as part of historical landscape management (Jackle and Janiskee 1975:198).

Research Domains

Research potential of historic redwood logging-related resources may be seen to reside in three interrelated domains: (1) the study of changing environmental perception and environmental reality during the historic period; (2) the analysis of a developing technology's adaptation to the challenges of logging and lumbering the *Sequoiadendron giganteum*; and (3) the examination of economic, social, and cultural processes operating within a frontier context. Each of these domains may be investigated employing evidence from redwood logging-related resources which have retained their integrity within the project area.

It should be noted that, while many of the specific questions relating to these three problem domains depend on archaeological data in the broad sense, not all require excavated data for their answers. As the research interests of historical archaeologists merge with those of technological and economic historians and historical geographers -- in the form of approaches to cultural landscape or settlement geography -- it is the specific temporal and geographical position of sites of a

particular form and function that becomes most relevant. The investigation of settlement pattern or cultural landscape may only require the identification and mapping of sites, rather that their extensive excavation. Although limited subsurface examination may be necessary in some cases to establish the precise temporal position and function of sites, historical settlement pattern and cultural landscape questions are most effectively addressed through the accumulation of reliable survey data on a regional level (House 1977). The value of this regional, geographic approach to nineteenth century logging has been well demonstrated in other parts of the country (Harris et al. 1977).

It must be also stressed that even though there are several important research questions regarding redwood logging which may not require excavated data for their answers, there are no such questions which can be answered without at least some analysis of primary historical sources. In fact, most of the research questions posed by this design cannot be adequately addressed without accompanying studies based on documentary and other historical evidence drawn from both the project area and beyond. Although at least two valuable secondary sources are available for the history of logging within the Hume Lake Ranger District (Andrews 1958; Johnston 1966), the full implementation of any one aspect of this research design depends on an intensive analysis of documentary and oral sources.

The Frontier Model

A research design for studying redwood logging, its technological, economic, and social organization, and the role of this industry in shaping the environment of the project area, must be based on a comparative perspective. This comparative perspective is afforded by the

concept of the frontier, as it has been used to describe a particular type of social and cultural process, as well as the geographic area in which the process occurs (Lewis 1977:153). In its spatial sense, the frontier is a zone into which a settled society expands in order to exploit economically valued resources (e.g., timber, grazing, land, mineral resources, animals). The resulting process of adaptation to a previously unsettled and undeveloped environment produces systemic change in several interrelated areas. These changes may be grouped as follows: (1) change to the physical environment through the land-modification activities which accompany various patterns of resource exploitation; (2) technological change resulting from the process by which methods employed to exploit resources are altered to accomodate the obstacles presented by local environmental conditions; (3) economic change at the regional, national, and international levels brought about by the incorporation of the frontier and its resources into the larger economic system; (4) geographic transformations which accompany patterns of settlement expansion into the frontier; and (5) social and cultural change resulting from the introduction of an immigrant population into the frontier zone.

In approaching the comparative analysis of frontier development in the American West, and particularly the problem of which of the above types of change are associated with specific frontier environments, it is useful to examine the following general hypothesis:

> American frontier experiences fell into two broad categories, cosmopolitan and insular. Cosmopolitan frontiers were associated only with modal change or change caused by factors not found exclusively within the confines of the frontier. Insular frontiers were associated with fundamental change primarily caused by factors exclusive to the frontier experience (Steffen 1979:96).

An important assumption contained in this hypothesis is that:

> Frontier change and continuity were both contests between the demands of the environment and the mind set of those entering its confines. The relationship between these two components was determined by how compelling and obvious environmental demands were for change and how deeply rooted were prefrontier principles and practices (Steffen 1979:95).

The adaptive process which characterized different types of frontier will thus exhibit significant variation in terms of the level upon which change occurs. Some frontier situations only produce alterations in behavioral patterns, without affecting basic cultural concepts or principles, while others create more fundamental transformations in cultural perceptions and, in some cases, stimulate the development of new mind sets or ideologies. This important distinction has been recognized by scholars working in a variety of historical fields, including archaeologists and folklorists concerned with material remains (Glassie 1975; Deetz 1977a).

In view of this hypothesis and the distinctions upon which it is based, the historic-period exploitation of timber resources within the Hume Lake Ranger District may serve as a laboratory for the examination of specific processes of change at work within one kind of frontier present in the West: the redwood logging frontier. In this case, redwood logging produced a cosmopolitan frontier, due to the nature and number of links connecting the project area with the mainstream of American society during the period in question (Steffen 1979:96). The proposition that change in such a situation will be neither fundamental nor the result of factors intrinsic to the specific frontier in question can be investigated with respect to each of the

five areas previously identified -- environment, technology, economy, geography, and society and culture.

The investigation of each of these research domains would require in-depth analysis of documentary and other historical sources pertaining to both the logging and lumbering operations within the project area and to similar efforts in the southern Sierras and elsewhere in California and the Far West. Not all of these research problems, however, benefit in the same way from the study of redwood logging's physical remains. The following discussion of research questions will thus identify the categories of data necessary for fully addressing each problem domain and estimate the scale of comparison involved, with emphasis placed on the role of archaeological data in this regard. In this way, the research potential or information yield of individual redwood logging sites and features should become apparent.

Reconstruction of Environmental Change

The generalized model of frontier process introduced above recognizes that frontiers will exhibit significant variations in terms of the specific role of frontier habitats, that is, geographical zones that present ecological obstacles as well as incentives to expanding social systems (Hardesty 1980:2). The California logging frontier's habitat, as represented by the Hume Lake Ranger District, played a crucial role in determining settlement location, the development of the area's transportation network, and specific applications of logging technology. These factors, in turn, were major determinants of economic success of lumbering activities within this portion of the southern Sierras. In order to fully understand these factors, it would be necessary to reconstruct the nature of this habitat, how it was perceived both by those

responsible for its exploitation and by those opposed to logging in the region; how it was modified during the course of timber harvesting; and how these modifications are perceived today in contrast to the known environmental costs of contemporary timber harvesting practices. Reconstruction of environmental change should proceed, simultaneously, on two levels: in terms of short-term changes occurring during the historic period (1860-1925), and in terms of long-term Holocene evolutionary trends.

Reconstruction of the region's environment and logging's effect on it depends on several important areas of analysis, as follows: (1) regional geomorphology and physiography; (2) areal climate and hydrology; (3) the distribution and history of plant communities; (4) cultural modifications to the environment; and (5) cultural perceptions of the region's resources, environment, and subsequent modifications to these. Of these, the latter three bear most directly on the study of redwood logging; they may be addressed by integrating the results of several specific studies. Analysis of vegetation maps which show plant community distributions may be used to establish baseline conditions for the Sierra redwood and other harvestable timber species, such as pine, fir, and cedar. The history of the forest within the project area and the factors contributing to changes within it, such as climate, succession, and cultural modification, may be traced through time with reference to several lines of evidence, e.g., historic/prehistoric-period pollen analysis, alpine meadow development chronology, tree-ring and burn-scar studies, and historic-period vegetation and aerial photographic interpretation. Although these data are not necessarily inherent in redwood logging sites themselves, their analysis can

contribute information essential to an accurate reconstruction of logging's impact on the environment, especially the effects of the harvesting and transportation of logs on the area's geomorphology, soils, water resources, and indigenous plant communities. Such reconstructions serve as a basis for evaluating the environmental costs associated with present-day timbering practices.

In addition to reconstructing the environment at the time of redwood logging and the actual impact of logging on the region's ecology, research should also be directed towards the question: To what extent were the effects of logging on the environment understood during the period when timber resources, and especially the redwood, were depleted in the project area? The study of environmental perception as it relates to the timber industry's expansion into the southern Sierras, particularly in terms of the conflict between exploitation and preservation, can be pursued by analyzing the writings of both those who designed, built, and founded the railroads and machinery used to harvest redwood and other timber sources within the Hume Lake Ranger District, and those who opposed them -- preservationists such as John Muir, William Kent, Gifford Pinchot, and Stephen Mather.

The question of environmental perception is directly related to what has been termed the "characteristic mental sets" of those participating in railroad logging (Hannay and McGinn 1980;40-41; McDonald 1980:4). How mindful were lumber company engineers, managers, and loggers themselves of aesthetic and environmental considerations in their work? If essays, letters, and personal recollections of the period offer a partial view of the attitudes and values which made up these mental sets, analysis of physical or material remains of redwood

logging in the project area can also provide important data regarding this problem.

> Early logging in general and railroad logging in particular are often characterized as extremely cost conscious and minimally considerate of environmental effects. Study of the logging systems in the field should provide some objective measure of these characterizations by providing evidence of where and how activities were actually conducted, and by comparing this evidence with historic and modern engineering standards (McDonald 1980:4).

It should be noted that reconstruction of the project area's landscape, as perceived by those actively engaged in modifying it, and the physical landscape created by these modifications, would require intensive analysis of primary and secondary historical sources as well as the interpretation of the material remains of redwood logging, both on the ground and, more importantly, as represented by aerial photographs of the Hume Lake Ranger District.

Technological Change

The use of railroads in the American logging industry may be viewed as one phase in the development of "a technology," that is,

> The complex of knowledge, methods, and other resources used in making a particular kind of product or in creating a particular procedural system ...at a given time in a particular society (Hannay and McGinn 1980:27).

In combination with chutes, flumes, winches, steam donkeys, and hoists, the railroad permitted the transportation of logs from the cutting area to the mill. Although logging of the Sierra redwood was accomplished in some areas without benefit of rail transportation, most operations located in the Hume Lake Ranger District incorporated the railroad. The project area also witnessed the construction of one of the longest

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flumes in the West, the first multiple-arched reinforced dam built in America, and an innovative and complex chute system which facilitated the logging of the greatest concentration of Sierra redwoods in the southern Sierras. Because of their size, brittleness, and environmental setting, the Sierra redwood proved both extremely expensive to log and of little commercial value as a high-grade construction material. Thus the application of railroad logging technology to their exploitation represents a unique chapter in the history of the American timber industry.

Reconstruction of this technology should be guided by the questions: To what extent were the methods employed within the Hume Lake Ranger District from the 1880s to the 1920s different from those developed and implemented by nearby competitors in the southern Sierras, as well as those used elsewhere in California and the rest of the country? Did these technological adaptations within the project area significantly contribute to refinement in railroad logging technology as a whole, or do they simply reflect an extreme case of technological advances which had already occurred within the logging industry of the Far West in response to the problem of felling, transporting, and milling species which were considerably larger than those being harvested in the eastern part of the country?

Examination of these questions would require the detailed reconstruction of redwood logging technology within the project area, with emphasis on those applications and modifications of existing methods which resulted from harvesting the Sierra redwood and from contending with the extremely rugged terrain in which many of these trees were located. Comparison of these methods with those employed by other California companies in the logging of Coast redwood, fir, and pine -- beginning

as early as 1850 -- could document the degree to which redwood logging within the Hume Lake Ranger District represented either a specialized adaptation of an existing technology or an important advancement within a developing technology.

In order to fully address these questions, it would be necessary to compare evidence of the technological knowledge and methods applied in the project area -- gained from the study of company inventories, site plans, and photographs -- with the extant material or physical expression of these methods -- the railroad grades, chutes, and other engineering features -- which may be partially preserved on the ground. This physical evidence can provide important data on the actual design, layout, and construction of features which cannot be obtained at the same level of accuracy from documentary sources alone.

Economic Change

It has been proposed that exploitation of the redwood and other timber resources of the Hume Lake Ranger District resulted in a cosmopolitan frontier phase within the area. In other words, between 1888 and 1923, the mill towns of Millwood and Hume which developed in the region comprised a frontier closely tied to the settled portions of California and to the rest of the country through its dependence on the national economic system and the fortunes of the lumber business. Because the latter has always been extremely sensitive to periods of recession, the economic success of lumber companies, no matter how well capitalized, has always been uncertain at best. In the case of redwood logging within the Hume Lake Ranger District, the companies involved in these operations never made a profit, even in the best of years. As a result, their history is closely related to national business cycles

of the late nineteenth and early twentieth centuries. With each depression, a new company with new investors emerged, reflecting the movement from industrial capitalism to corporate capitalism in the lumber business. This trend has, of course, continued throughout this century, so that very few small, individually owned lumber companies remain in the West. Most have been absorbed by large corporations, such as Louisiana-Pacific and Weyerhauser.

In view of the great expense associated with gaining access to redwood groves within the Hume Lake Ranger District, and the waste in logging these trees resulting from their size and brittleness, it is difficult to understand why they were harvested in the first place. Nevertheless, the redwood groves were clear-cut; in the process may be viewed the decision-making which accompanied the attempt to cut costs while at the same time maintaining technological efficiency. To reconstruct the national and regional economic context of redwood logging, therefore, research should focus on the adaptive strategies employed by both the lumber companies and their employees in the face of economic stress produced by periods of recession and depression in the early 1890s and 1900s and during the First World War.

While this general problem can certainly be investigated using documentary sources such as the Hume-Bennett and Sanger Lumber Company papers, it is proposed that cost-consciousness and related strategies for coping with periods of economic stress will also be reflected in two basic categories of redwood logging's material remains: (1) the railroad and related engineering features and machinery constructed and installed during periods of recession; and (2) the artifactual remains associated with households in evidence at the mill towns and camps of the project area.

Aspects of cost-cutting and retrenchment on the part of the two large-scale operations which, between 1888 and 1923, logged the project area, should be evident in decisions regarding where to cut and how to gain access to these locations. Analysis of railroad spur and chute routes chosen during periods of economic depression, as well as their method of construction, could very well indicate a level of risk-taking and even desperation which is not evident during periods of expansion following reorganization and infusion of new capital. An important strategy for future research should thus be the reconstruction of these economic or business cycles as they affected the national and regional lumber market, followed by comparison of those company records which document decisions regarding which areas of timber to open up and what equipment and methods to use, with on-the-ground physical evidence of routes selected as well as construction techniques and engineering principles employed in these movements.

Once periods of economic stress have been precisely defined, their effect upon consumer behavior and standards of living of the households of company personnel who occupied different positions within the company hierarchy can be traced through the recovery of artifactual materials, should they be present on the sites of the project area's mill towns and camps. The settlements of Millwood and Hume, as well as the main camp located in Converse Basin, had separate housing for the families of married loggers and other employees. Depending on the degree of precision accompanying the location and the identification of household members, it may be possible to define adaptive strategies in consumer behavior on the part of households. Such analysis will, of course, depend on the reconstruction of regional and areal trade networks, with

particular reference to the source and availability of household and other manufactured goods. In part, this reconstruction can be based on documentary records, such as company store inventories, but it will also benefit from the recovery and analysis of artifactual remains, especially those encountered in discrete features such as privy pits.

This attempt to define household consumer response to cycles of economic change would also require comparison of household-specific refuse with the remains associated with the single men's barracks and the company dining or mess halls. These materials, together with evidence of purchasing patterns contained in company records, can indicate the extent to which the company attempted to cut costs in the areas of food and shelter. A recent study suggests that even in the face of retrenchment, lumber companies were wary of reducing the quality and quantity of mess hall offerings (Carlin 1979).

A final comparison should be between the household refuse of lumber company families holding different positions in the company hierarchy and a sample of materials from the sites of houses occupied by families who resided in the area on a seasonal basis for recreational purposes. This comparison should permit a more accurate characterization of both the general economic position of company employees and the consumer strategies employed at the level of individual households. It should be stressed that these comparisons are also essential to the study of other important questions pertaining to the study of social and cultural change within the project area. Their investigation requires not only painstaking documentary research but extensive sampling of both discrete refuse features and communal dumps. The feasibility of the latter is obviously dependent on the accessibility and state of preservation of

residential portions of mill towns and camps.

Geographic Transformations

The logging and lumber industry, as it expanded into various wilderness regions in the West, brought with it a distinctive, if somewhat transitory, settlement pattern. The major components of this pattern have recently been identified as the mill town, satellite center, and camp (Rock 1980:1). While large mill towns were located in areas where water and transportation were already available or easily obtained, satellite centers and permanent and seasonal camps were usually established closer to the timber sources. Logging activity in the Hume Lake Ranger District produced all of these settlements: Sanger being an example of the large company town, and Millwood and Hume representing satellite centers. In addition, there were numerous seasonal camps occupied for a few years scattered about the area, which are now identified by number (e.g., Camp 1). A major research goal would be the reconstruction of this settlement pattern as it developed from the 1880s to the 1920s in response to both the depletion of timber in areas closest to the satellite centers and the company's continuing effort to reduce costs.

In addition to an accurate description of the logging-related settlement pattern within the project area a more general model of the geographic transformation which accompanied logging of the Sierra redwood can be developed. An attempt should be made to construct a frontier model appropriate to the exploitation of timber in the Far West during the second half of the nineteenth century and the early part of this century. Although several geographic models of the frontier are available (e.g., Hudson 1977), including some which have been

applied to archaeological data (Lewis 1977; Hardesty 1980), they are biased in favor of an economic system based on agriculture and permanent settlement. The geographic characteristics of the frontier proposed by these models are, for the most part, not appropriate to logging frontiers, in which settlement was rarely permanent. The stable communities that were present in the project area were the result of recreational development. The recreational use of areas opened up by the lumber industry was common in many portions of the Far West. At first recreational settlements co-existed with the mill towns and satellite centers. After the lumber companies went out of business, many of these towns became exclusively recreational in nature and continue today. A geographic model of the logging frontier must address this pattern of settlement succession from a comparative perspective. Such analysis would be based on accurate description of settlement succession in the Hume Lake Ranger District, together with the examination of other logging areas of California and the Far West where studies have been made or other comparative data are available.

Description of the Hume Lake Ranger District and adjacent regional settlement patterns will clearly depend on accurate and complete survey data (House 1977); such surveys should pinpoint the locations of all settlement units and map these locations relative to the transportation system constructed to gain access to and remove logs from the project area. In addition, analyses of company records, such as building, equipment, and site plans, and historic and aerial photographs, would be required to fully explicate the pattern of settlement succession within the Hume Lake Ranger District.

Social and Cultural Dynamics

During the half century that logging operations were active in the project area, as many as a thousand men were employed felling timber, transporting it to the mills, and converting rough lumber to a variety of finished products at the Sanger facility. In addition, hundreds of men, including a large number of Chinese laborers, were involved in the construction of the flume, dam, and railroads which formed the basis of the transportation system developed for the last two phases of lumbering in this area. At the major satellite centers of Millwood and Hume, support communities grew up which included stores, saloons, hotels, and schools. Unlike the seasonal camps, which had portable buildings, these mill settlements quickly began to resemble frontier towns, with more permanent architecture, including separate housing for the families of married employees.

Thus the project area affords an excellent opportunity for the investigation of many of the processes of change which archaeologists are presently exploring in other company towns in California and elsewhere in the West. Most notable in this regard is the study of cultural pluralism and assimilation currently being undertaken by Dr. James Deetz and his students at the coal-mining settlement of Somersville in the Mount Diablo region. Because this town had a population representative of a number of different ethnic backgrounds, including Welsh, Italian, Mexican, and Chinese, the major goal of research there has been to identify the manner in which cultural differences were maintained in the face of a variety of assimilative pressures.

In view of the similarities between Somersville and the company

mill towns of Millwood and Hume, it is proposed that a similar approach could be applied to the problem of cultural and social dynamics within the Hume Lake Ranger District. Both mining and logging were important occupational specialties during the late nineteenth century. A major difference between them may relate to the ethnic backgrounds and national origins of individuals attracted to each occupation. A priority of research should be the reconstitution of the employee population residing in the project area during different periods of logging activity. Once the dominant ethnic groups have been identified in terms of when they were there, their place of residence (single or married housing), and their position within the occupational hierarchy, it may then be possible to examine the degree to which cultural and social differences existed within the population of company employees. Of particular concern should be defining the importance of occupational specializations as an assimilative force in such late nineteenth century frontier contexts.

As with the problem of the consumer strategies employed by households of different economic levels during periods of stress (i.e., depression, recession), analysis of cultural or ethnic differences present among the mill town residents would require the excavation of discrete refuse features associated with identifiable households. Before such an approach can be adopted, it would first be necessary to establish (1) that documentary sources permit identification of individuals and families living in Millwood and Hume, as well as their specific places of residence; and (2) that these areas still retain integrity. Company records relating to employment and personnel matters, if available, should be examined to ascertain the detail available

regarding who was employed during a given season, the length of this tenure with the company, and the housing assigned to them. Other sources, such as the Federal census, must also be reviewed thoroughly before the research strategy outlined above can be implemented.

Successful implementation of this strategy would depend on comparison with other archaeological studies of frontier settlements which were not developed as the result of corporate investment. Frontier situations in which no single company controlled the resource being exploited may exhibit markedly different patterns of ethnic differentiation. It may be proposed that assimilation will be greatest in those frontier contexts which were controlled by individual companies and where members of different cultural groups participated in a single cooperative venture, such as logging in the Hume Lake Ranger District during the late nineteenth and early twentieth centuries. By contrast, those frontier contexts in which resource competition occurs (e.g., placer mining during the period 1849-1880) should exhibit a strengthening of cultural differences (Hardesty 1980:5) Analysis of settlements within the Hume Lake Ranger District can contribute to the refinement of these general hypotheses.

The Discovery Phase

It should be clear that examination of questions pertaining to each of the problem domains previously outlined requires much more precise and accurate data regarding the location, function, and current state of preservation of redwood logging sites than is presently available. In view of this situation, a major objective of the overview has been to construct a detailed typology of features and sites associated with logging in the Hume Lake Ranger District, organized according to the

three basic phases (1860-1888; 1888-1905; 1905-1923) and areas of lumbering activity in the area (chapter 5). This typology, in combination with other portions of the overview, permits the design and implementation of intensive surveys undertaken in light of the following four questions suggested by Lewis (1977) and House (1977): (1) What patterns of site location are evident relative to the distribution of transportation, water, topographic, and other environmental features? (2) What is the temporal span of site occupation or use? (3) What is the nature of site structure and function, with emphasis on the spatial organization of technological activities? and (4) What are the cultural and social backgrounds of individuals residing at the mill towns and other settlements?

Should the discovery phase of research, based on the overview, reveal that the major habitation sites associated with logging in the project area have at least some integrity, it would then be possible to examine a series of more refined hypotheses derived from the questions outlined in this research design. These hypotheses should be derived from general propositions regarding the nature of frontier economic systems, processes of cultural interaction, technological change, and geographic transformations, such as have been described in this research design.

In constructing the site typology, an effort has also been made to consider as cultural resources aspects of the landscape which are often not accorded such status. Because they are as much the product of logging as the town of Hume or the railroad grades in the Millwood area, Sequoia Lake, Hume Lake, logged-over portions of Converse Basin, and even The Boole Tree are included in the typology of redwood logging-relate

cultural resources. Their significance resides not only in what these features communicate to the public but also in what the symbolic meanings derived from them reveal about changing environmental perception during the period of the middle 1800s to the present.

Significance of Redwood Logging Remains

Introduction

The entire redwood logging region surrounding Hume Lake can be thought of as a "site," but treating it as such does not allow for very fine discrimination. It does, however, point out the essential and integral role played by the various components (sites, features, and locations) making up the entire lumbering system as it once operated in this district for over a half century. All three historical phases were inextricably linked and, when viewed as a whole, represent the evolution of a complex social and technological system. The extent to which the initial logging operations of Phase I contributed to the attraction of the later, much larger, operations of Phase II and Phase III has not been assessed, and therefore these remains must command the same degree of significance as those in the later phases. The logging of these trees had small beginnings, to be sure, but it finished with a devastating and destructive force that left a void within Converse Basin which may still be seen and felt today. Because no other attempts were made in the Sierra Nevada to log the Sierra redwood on a scale comparable to the operations in this district, the history and remains of the industry within the Hume Lake Ranger District represent a unique chapter in the development of the timber industry in California, as well as within the nation as a whole.

The entire redwood logging region is viewed here as a "total system" composed of a series of "subsystems," such as that of transportation. These subsystems are in turn made up of specific activities such as hauling or skidding. Considered in this way, each landscape, site, linear feature, location, and isolated artifact can be assessed as to its significance in understanding the total system. Thus, redwood logging in the Hume Lake Ranger District, represented today by cultural landscapes, material remains, and historic documents, consists of "sites, buildings, structures, and objects of State and local importance" which "possess integrity of location, design, setting, materials, workmanship, feeling, and association," and are "associated with events that have made a significant contribution to the broad patterns of our history" and therefore "may be likely to yield information important in history" (National Register, 36 CFR 60.6).

It has been proposed that the study of cultural change may be accomplished by using a systems theory approach directed at the organizational levels of an industry (Fried and Molnar 1978). Fried and Molnar contend that, until recently accurate assessment of technological and cultural change has proven difficult because analysis has been undertaken at too abstract a level. They suggest that by focusing on "zones of organizational activity" the identification and interpretation of specific social and technological changes can be accomplished (Fried and Molnar 1978:21). To illustrate the applicability of their method, they present three case studies: (1) an on-going air traffic control system in a modern airport; (2) the transformation of a Japanese town into a "modern industrial state;" and (3) the collapse of the Manchu Dynasty of China. It is proposed here that the historic archaeological

remains of redwood logging located in the Hume Lake Ranger District provide an excellent data base with which to test this systems approach. Sufficient physical remains, as well as documentary records, detailed enough to serve as a control, are available for the analysis of redwood logging through its various organizational zones of activity. This approach should provide a more complete understanding of the role which management decisions (which reflect certain attitudes) or technological levels played in the eventual failure of the lumbering industry in this region.

Although differing levels of technological and engineering ability existed at particular times, it was not always this knowledge that played a major role in the decision-making process. For example, within the Tahoe National Forest, remnants of historic railroad trestles show that even though more resource-efficient and refined engineering skills were known at the time, individuals responsible for building certain trestles constructed less efficient (in terms of resource utilization), crudely composed structures, using an over abundance of materials (Elisabeth Bacus, personal communication). Such actions reflect the commonly held attitude among most members of the lumbering community around the turn of the century in California that the forests were endless, and therefore the need to conserve was rarely considered. This view of the "characteristic mental sets" of those in charge of exploiting timber resources offers direct evidence into previous perceptions of the environment (see page 127). Thus, comparison of the technological level of remains discovered within the Hume Lake Ranger District with different levels of technology available at the time can offer possible answers as to the decisions and attitudes of manage-

ment (see page 128). By combining an analysis of this sort with reconstruction of the industry through time (from historic documents) and space (from archaeological/geographical records), answers to important questions of cultural and technological change can be forthcoming.

Therefore, systems analysis, frequently used by archaeologists to evaluate prehistoric data and by social scientists to evaluate ongoing systems, can be applied to historic archaeological data to test propositions using controls not available to prehistorians. Toward this end, it is essential that the entire redwood logging system which once operated in the project area be explicated as far as the historical and archaeological record will permit. As a preliminary step in this direction, this section offers quidelines for the identification and recording of the entire range of physical and cultural remains left from this industry within the present-day Hume Lake Ranger District. It follows that the next stage of research is to perform an intensive survey of the historic logging-related resources encompassed by this district. Such survey permits those pertinent research questions posed in the research design to be addressed more fully and allows for a more reliable determination of the representativeness of different categories of these remains.

Individual Site Significance

Because the significance of many of the historic redwood logging resources within the District relates directly to their location and association with the entire system, once they have been appropriately recorded, their research potential is largely realized.

In reviewing this discussion of significance, it is important to

bear in mind the dangers of presentism. The methods archaeologists use and the questions they seek to answer are continually being refined and consequently future determinations of significance may well be very different from those of today. Thus, the National Register criteria developed to determine the significance of cultural resources located on Federal property are necessarily broad and allow most all archaeological and historical properties to be determined significant under at least one of these criteria (especially criterion d, which states "sites that have yielded, or may be likely to yield information important in prehistory or history").

Furthermore, as pointed out by McGimsey and Davis (1977), it is not realistic to preserve all sites. They suggest, therefore, that a representative sample of a particular resource base be preserved or investigated. "Representative" is defined as:

> a sample characterizing as accurately as possible the full range of variability of the cultural resources. This array should reflect the true parameters of these resources in time and space. Such a sample of sites, if preserved, will replicate the main features of the original population of sites so that in the future new problems can be approached, using new techniques, with reason to believe that the results can be validly extended to the original population (McGimsey and Davis 1977:32).

Therefore, when applying the principles of information loss and nomothetic potential to individual remains, it is possible to make only a preliminary assessment of their significance. "Preliminary" is stressed here because the entire range of historic redwood logging-related resources within the Hume Lake Ranger District is unknown at present, and reliable determination of what is representative is not yet possible.

Isolated Artifacts and Locations

Certain categories of archaeological resources related to the logging industry possess minimal intrinsic research potential: isolated artifacts and locations. Artifacts lose much of their interpretive value when they have been removed from their original context and consequently have no direct association with specific historic logging tasks.

It would be inaccurate to say, however, that these resources do not contain information pertinent to the system as a whole. For instance, a specific artifact represents one aspect of a particular technology and, in combination with other artifacts, can be used for reconstructing technological processes not described in the historical record (e.g., low-level technology, see page 115). Since little documentation has been focused upon Phase I technological development, many of the artifacts associated with this phase can provide evidence of the specific ways in which objects were designed, manipulated, or used during this early stage of lumbering in California and the project area in particular. As material manifestations of the individual components of an abandoned technology, individual artifacts can provide valuable historical data.

Although there is better documentation of the technology available and employed during Phase II and Phase III, most documents relate to relatively high levels of technology, such as the mill plans and machinery manifests contained in the Hackley-Hume papers. Specific applications of basic human labor and ingenuity, as well as associated hand tools and jerry-rigged equipment, are not nearly as well known. Thus, some isolated artifacts from these phases would have significance

comparable to those associated with Phase I.

Locations, such as temporary storage areas, steam donkey locations, and felling areas, are essential to understanding the operation of the system as a whole and allow for a description and refinement of resource utilization strategies. In plotting these locations, it is possible to place the specific activity or system -- depending on the level of analysis -- within the particular frontier zone it occupied (see page 122). Thus, mapping specific locations and their boundaries results in essential data for the analysis of the system under study. These data also allow for the comparative analysis of similar social, cultural, and geographical processes created through land-modification activities, based upon the frontier model presented earlier in this chapter (pages 122-125).

Therefore, most of the significance which can be attributed to isolated artifacts and most locations associated with the historic redwood lumbering industry relates to their geographical position within the total system. In other words, the primary significance of these remains, as well as the other redwood logging-related resources, lies in their ability to yield information important in fully comprehending the history of this unique industry. Consequently, for their significance to be realized, the recording of these remains is necessary. Once locations have been mapped and photographed, their value for answering important research questions pertaining to this industry becomes minimal. While specific artifacts or locations may have further inherent significant attributes, such specific significance cannot be wholly determined until each is encountered in the field, and an assessment of representativeness is available. Specific recommendations re-

garding possible management alternatives for these remains are offered in chapter 7.

Linear Features

One of the basic components of the historic redwood logging system was the transportation network created to transport workers, equipment, supplies, logs, and lumber. Many of the features developed to fulfill this task are linear in nature and can take various forms depending upon such factors as technological development or environmental constraints (e.g., skidways, skidroads, railroad grades). These linear features serve to connect various locations and sites, linking them into an interwoven system. Further research into the technological level and distribution of these features can offer information essential to the understanding of technological change (pages 128-130), economic change (pages 130-134), environmental perceptions (pages 127-128), and social and cultural dynamics (pages 136-138).

Within the Hume Lake Ranger District, linear features of the historic logging era exist in such forms as crude roads, skidways, skidroads, pole-chutes, wooden tramway remnants, railroad grades, and flumes. As can be seen by reviewing the site typology tables (chapter 5), not all types of linear features occurred in each of the three historical phases. Whether the lack of certain linear features in particular phases, especially Phase I, represents a lack of capital necessary to incorporate available technology or whether it represents particular management decisions cannot be determined without further research.

The entire complex of linear features associated with each historica phase, as well as in the total system, illustrates the specific extent

and organization for each phase of lumbering. Using plat maps located in the Michigan State University Archives and the Bancroft Library, the transportation network can be accurately mapped for successive seasons, which could allow a diachronic interpretation of the evolution and expansion of the redwood logging industry in this District to be made. Such an interpretation will be useful in understanding the history of the lumber industry in this region, in California, and in the nation as a whole.

The transportation system in these historic lumbering operations was the most costly aspect of the business. It follows that many decisions pertaining to transportation, such as type of transport features to use, where to locate them, and how much money to expend on them, would be crucial to the success or failure of an operation so closely connected to the nation's economic cycles (pages 130-134). Decisions such as these are not usually described in historic documents. However, a determination of probable management decisions -- such as whether to cut costs or maintain technological efficiency -- may be possible through an intensive analysis of the types of transport modes chosen, their locations through time, the available levels of technology from which to choose, and the costs expended (pages 130-131). Thus, an assessment of the economic, technological, and social and cultural changes which these companies underwent may be possible.

Further assessment of company priorities may be possible by comparing the level of technology employed in fulfilling certain needs to available levels of technology. As noted above, this allows predictions regarding attitudes not usually forthcoming from company documents alone and provides essential information for conclusions regarding

early "mental sets" (page 127). A further comparison with expenditure records, such as wage, food, or supply lists, could offer evidence as to the importance of the transportation needs relative to other essential needs of the company. Analyses such as these would provide insight into the adaptive strategies employed by the different lumber companies during different periods of time (page 131). Many of the records needed to perform such analyses exist for the third phase of lumbering in the Hackley-Hume papers and the Spivey Collection. Specific records pertaining to this type of research, however, have not been located for Phase I or Phase II. More intensive documentary research than was possible under this procurement needs to be undertaken in order to assess the availability of such records.

The features themselves illustrate the level of technology used during stages within each phase and serve to document the location and extent of expansion for individual concerns. The maps presented in this report, originally prepared by Donald C. DeVere, illustrate the extent to which the companies in Phase II and Phase III expanded. They also show the means of transportation incorporated to reach those areas. It should be reiterated that these maps <u>do not</u> include <u>all</u> of the historical transportation features and therefore should not be taken as representing the entire network created as a result of logging in the District. Neither should the maps be taken to represent the entire range of other sites or locations. The maps are primarily useful as reference tools to be used with other sources and other maps. For example, aerial photographs (black and white, 1940s) on file with the Forest Service document linear features associated with this network that are not shown on DeVere's maps. In any attempt to identify,

locate, and record this subsystem, therefore, it will be necessary to combine the information in these two sources with that on other available plat maps.

The primary significance of linear features is comparable to the significance noted above for isolated artifacts and locations. It is essential that the entire network of linear features be identified as to type and location, the sites and locations which they connect, and the extent to which they occur throughout the district. Although the maps compiled by DeVere offer an excellent point of departure, considerable refinements are needed in accurately recording this network. Once the entire network of remains pertaining to the transportation subsystem has been located and recorded, the significance for some of these remains will have been realized; many of the pertinent questions as to economic change and/or geographic transformation can be addressed through this locational information in combination with the documentary record.

Certain linear features do have inherent attributes, such as engineering and technological qualities, assessable only through analysis of the actual physical remains. Detailed recording of the physical attributes of these remains can provide specific evidence of construction techniques and engineering principles employed. These data can be used to address questions of technological change (page 128) and offer insight into the decision-making processes of different companies.

Railroad grades, trestles, tramways, and flume sections are those linear features illustrative of low levels of technology that cannot be reconstructed solely through historic documentation (Teague 1980:19).

Archaeological analysis of these remains, therefore, will contribute to the understanding of basic principles of logging and its related technology as it developed during specific periods (pages 115-116). There is a good likelihood that essential information pertaining to this technology and its development and to associated engineering skills will be lost if further preservation and/or investigation is not undertaken. Documentary sources do not adequately discuss information pertaining to the design and construction of these features. Archaeological investigation can address many of these questions and should be pursued when necessary.

As noted previously, the information potential of certain linear features, such as skidways, pole-chutes, and crude roads, may be realized once their precise location and extent are known and recorded. These features will not yield technical data that cannot be obtained through analysis of documentary evidence. Nonetheless, these features were essential elements of the whole system as it once operated, and they are very significant to an understanding of the total operation and its evolution. In addition, these features all have public interpretive value, thus, a representative sample of all linear features should be preserved and/or investigated. Specific recommendations regarding these linear features are presented in chapter 7.

Sites

Sites within the Hume Lake Ranger District are defined as those areas where several interrelated activities occurred, where temporary camps were located, or where relatively permanent and strategically placed equipment was positioned. Sites include landings, hoists, field camps, flume stations, mill sites, mill towns, and dams (chapter 5).

Each site was an integral component of the larger system, to which it was linked through a complex transportation subsystem. In assessing the system's potential to address those pertinent questions relating to economic, technological, environmental, geographical, and social and cultural change, an inventory of the entire range of sites and their locations is necessary.

Based on the comparative concept of the frontier, the settlement pattern created by the redwood logging industry can be analyzed on three levels: the site-specific, the local (i.e., project area and surrounding environs), and the regional. At the first level, the organization and use of space evident on individual sites (i.e., intra-site settlement pattern) can be reconstructed from a combination of existing site plans drawn from memory, historical photographs, and selective subsurface testing. Once such reconstructions have been accomplished, they can be compared through each phase of the industry to determine what factors appear to have influenced the placement of sites and their spatial structure within the project area. Is there a distinctive mill-based town layout evident in the sample from the Hume Lake Ranger District, and does the later growth of towns, such as Millwood and Hume, reflect their industrial or recreational function? Do the patterns which emerge correspond to those present in adjacent areas of the Sierras where similar logging to recreational settlement succession occurred?

After the geographic transformations accompanying a logging-based, and later a recreationally oriented, frontier expansion have been characterized for the project area and immediate surroundings, comparisons can be made with settlement-pattern reconstructions and locational

analyses from other areas of California and the Far West, where logging and recreation served as the stimulus for settlement expansion. In this way, important generalizations may be derived regarding an often neglected aspect of the frontier settlement process in the western United States during the late nineteenth and early twentieth centuries.

As noted above with respect to isolated artifacts, locations, and linear features, much of the information pertaining to settlement pattern reconstruction and locational analysis can be gained from site identification, mapping, and other appropriate recording. In some instances, however, subsurface examination will be required. Successful completion of such analysis also depends on an exhaustive documentary and oral history research program. These contextual data are essential to historic-period site-settlement system reconstructions.

As with linear features, certain sites associated with this industry contain potential data obtainable only through assessment of the actual physical remains. For example, in attempting to reconstruct environmental change (page 125) or geographic transformations (page 134) it would be necessary to compare evidence from company records with engineering features that are still preserved at these sites, e.g., the physical remains atop Hoist Ridge. As noted in the research design, adaptations to environmental obstacles vary from frontier to frontier, as have the development and application of particular technologies to exploit valued resources. Company records rarely document these different adaptations as well as do the actual physical remains. For example, although two lumbering companies in

separate regions may refer to their use of hoists, the physical expressions of hoist sites may differ depending upon the timber sources being exploited and the environment in which it is found. The logging of the Sierra redwood required hoists which were larger and more permanent than those necessary to log pine, cedar, or fir.

The success or failure of the early lumber industry depended heavily on the national economic system. As a result, the lumber companies were particularly sensitive to rises and declines in the overall economy. For one reason or another, company records do not always document those profits or losses resulting from short-range economic cycles. As integral components of the system, however, mill towns and mill sites would most definitely be affected by these fluctuations. Thus, the material remains associated with these sites would reflect the ever-present cost-conscious strategies employed to maintain technological efficiency, while keeping costs at a minimum. Although aspects of this decision-making and purchasing process can be seen in the documentary record, they should be most directly observable through the analysis of material remains. The degree to which these sites (especially Millwood and Hume) can contribute to such research is not now known. Further field evaluation to assess their information potential regarding this type of analysis is required (chapter 7).

The dam engineered by John Eastwood and erected in 1908 is one of the most significant surviving resources of this industry. The design of this dam was innovative, as it retained its strength while utilizing a minimum of materials. This structure has the potential to qualify for inclusion on the National Register under criteria (c),

in that it "embod[ies] the distinctive characteristics of a type, period, [and] method of construction" and (d) is "likely to yield information important in history." It offers tangible evidence of technological levels available at the turn of the century and is accessible to the public.

The investigation of domestic components at sites in the project area is complicated by several factors, not the least of which is the lack of information regarding the identity and place of residence of most individuals making up the labor force during different phases of redwood logging. Of those sites having associated domestic materials, the flume stations located at various intervals along the entire length of the flume appear to have the greatest potential for correlations at the household or individual level. The flume herders usually lived by themselves for long periods of time. An in-depth review of the Spivey Collection could reveal specific names, length of employment, and possibly the ethnic affiliation of these individuals. Should trash deposits or privies be located at station sites, they may be analyzed in light of this information.

The same degree of control is, of course, required for the mill settlements if specific hypotheses concerning household consumer strategies, artifactual comparisons of ethnicity, and the nature of assimilative forces at work in late nineteenth century lumber towns are to be successfully investigated (pages 132-133; 136-138). Answers to these questions depend on discrete subsurface trash deposits, as well as on the identification of individuals, families, and other social units responsible for their presence. From the preliminary historical research carried out under this contract, such identifications

cannot be made for either Millwood or Hume. Although the Federal censuses of 1880 and 1900 may provide some help, both employee rosters for different years and a list of company housing arrangements are required to pursue this avenue of analysis. Such documents do not exist in the Hackley-Hume papers, and, unless records from the Sanger office are uncovered, it is likely that such data will only be forthcoming from systematic and extensive oral history interviewing. If identification at the household or individual level does prove impossible for these towns, many research questions regarding social and cultural dynamics can only be addressed in more general terms.

Much of the above research potential depends on the condition and degree of preservation of cultural materials associated with the various sites located within the project area. The assessment of integrity is not possible at present. From the brief field visits carried out for this overview, however, it does appear likely that some sites contain subsurface materials which can assist in addressing many of the questions outlined in the research design.

In addition to the research potential of these sites, many have interpretive potential which could be of value to the public. As many of these sites are easily accessible, an interpretive program could heighten the public's awareness of the history of this area. Recommendations as to possible management alternatives for these sites are offered in the following chapter.

Landscapes

Located within the Hume Lake Ranger District are cultural landscapes created by the lumbering of the Sierra redwood. The very nature of this early lumbering industry and the resource it was exploiting

were responsible for leaving behind a cultural landscape unique in the history of lumbering in California and the nation as a whole. Certain landscapes can be thought of as material manifestations of culture, as they are segments "of man's physical environment which [are] purposely shaped by him according to culturally dictated plans" (Deetz 1977b:10). Thus, the cultural landscapes left by the lumbering of the Sierra redwood reflect these plans and offer excellent evidence for evaluating the manner in which the owners and managers of lumber concerns perceived their environment (page 120). Combining this assessment with the analysis of specific behavior patterns as outlined in the research design, the reconstruction of the cultural landscape is possible (page 120).

Cultural landscapes of historic logging remains were created by the construction of access routes, transportation networks, daming of streams, and clear-cutting of the Sierra redwood in particular areas. Each of these activities contributed to the cultural landscape as logging companies expanded into new areas, altered the environment, and exploited the available resources. Examples of known landscapes within the project area are Hume Lake, The Boole Tree, Stump Meadow in Converse Basin, and Indian Basin. The latter three were created by clear-cutting the Sierra redwood, whereas Hume Lake was created by daming Tenmile Creek to form a water supply for other lumbering activities. All, however, are results of man shaping his environment according to culturally dictated plans.

While it is necessary to recognize, locate, and record the individual landscapes created by this industry, the combination of all landscapes created by individual activities and the features connecting them

creates a landscape of the entire system. The extent and boundaries of this larger landscape are important in understanding the larger social order responsible for its manifestation. As Jackson pointed out:

> For the significance of space in landscape terms, the allotment of land for private or public use, is that it makes the social order visible....a boundary is what binds us all together in a group, that which excludes the outsider or stranger. The boundary creates neighbors; it is the symbol of law and order and permanence. The network of boundaries ...transforms an amorphous environment into a human landscape, and nothing more clearly shows some of the cherished values of a group than the manner in which they fix those boundaries, the manner in which they organize space. And, because these values change in the course of time, the organization of space also undergoes a change. That is one reason why the contemporary landscape is so different from that of even a hundred years ago.
>
> The original layout of spaces is well worth studying...if only because it unconsciously reveals so much about the ideas of men and women who devised it (1980:115).

Since landscapes provide the opportunity to study previous social orders, and because logging of the Sierra redwood has not been carried out anywhere else to the extent that it was within the Hume Lake Ranger District, the project area offers a unique opportunity to express to the public at large images of a past society important in the history of the region and California.

The interaction of the public with these relict landscapes -- the attitudes and emotional associations they engender -- is also a very important dimension of their significance:

> A critical point is that if resources are loved, then the underlying denominators of these resources are perception and context....Perception is the interaction between the observer and the

> resource, and context is the space and time phenomena of the interaction....To design programs for the identification and preservation of these resources solely in scientific terms (thus negating emotional aspects) needlessly sacrifices the major part of their attraction, their worth, their essence (Frondorf *et. al.* 1980:19).

The remnant Sierra redwood groves, as well as the expanses of stumps left behind by logging, clearly have symbolic meaning for the public. In fact, it has been suggested that they function as ceremonial landscapes for many people -- places which communicate both the awe-inspiring dominance of nature and the destructive capacity of man (Erickson 1977). The visual and emotional impact of these landscapes cannot be denied. There is much to learn from analyzing these interactions, and such studies would help to clarify the symbolic processes involved in the creation of cultural landscapes within the project area. Recommendations for such work and possible management alternatives are offered in the following chapter.

One final category of resources contained within the Hume Lake Ranger District has not been included in the site typology because it is not directly the product of logging. Often a part of the cultural landscape, this category includes those areas which contain information essential to the reconstruction of environmental change in the project area. Consideration should be given to those portions of the District where alpine meadow development studies, prehistoric and historic pollen analysis, and tree-ring and burn-scar studies can be profitably conducted. As noted in the research design, these areas are not always directly associated with redwood logging or other historic and prehistoric land-use patterns, but they do contain important contextual

data. Thus, their identification, evaluation, and preservation should be coordinated with the management of cultural resources within the project area.

Chapter 7

MANAGEMENT RECOMMENDATIONS

Introduction

As part of the Department of Agriculture's recently issued regulations guiding land and resource management on National Forest Lands, each Forest is responsible for preparing a plan which includes provisions for "the identification, protection, interpretation, and management of cultural resources" (36 CFR 219.12 (L)). More specifically, the Forest Plan should contain: (1) overviews of known data pertaining to the Forest land's history; (2) recommendations regarding areas of the Forest which require intensive survey; (3) procedures for identifying and evaluating sites in terms of National Register of Historic Places criteria; (4) measures for protecting cultural resources from both human and natural agents of destruction; (5) recommendations for the maintenance of significant historic sites; and (6) strategies for realizing the interpretive value of cultural resources for the public's education and enjoyment. In addition, the relationship between cultural resources and other multiple uses of Forest land are to be analyzed in the course of defining planning alternatives, particularly in terms of the effect which various cultural resource management practices will have on these other uses, and the impact of these other uses on cultural resources. Furthermore, this analysis will be "coordinated to the extent feasible with the State Cultural Resource Plan, and planning activities of the State Historic Preservation Office, the State Archaeologist, and other state and federal agencies" (36 CFR 219.12 (L)).

It is in terms of these regulatory guidelines and the problems pre-

sented by the preparation of a cultural resource management section for the Sequoia National Forest Plan that this chapter details a management strategy for historic redwood logging remains within the Hume Lake Ranger District. The recommendations contained in this section of the report explicitly identify those areas which require more intensive survey. Based on the site typology and preliminary analysis of significance presented in the previous two chapters, the need for protective measures on known logging-related sites is discussed, as is the need to maintain the most important of these. Those logging-related sites and features which appear to have the greatest potential for public interpretation are identified. In the absence of a thorough knowledge regarding present and future multiple uses of the Forest, specific impacts of these uses on redwood logging remains cannot be predicted. Probable impacts, however, are described in general terms. This section of the report also offers some suggestions regarding the coordination of the Forest Service's program to properly manage redwood logging remains with the California Office of Historic Preservation's Plan. Finally, an attempt is made to integrate the treatment of historic redwood logging remains as purely a cultural resource management problem with that component of the Forest Plan which addresses "landscape visual attributes and the public's visual expectations" (36 CFR 219.12 (i) (6)), since important aspects of the latter (i.e., historic landscapes) are closely tied to the effects of historic logging activities.

Intensive Survey and Oral History Program

It was noted in the preceding chapter that certain categories of historic redwood logging remains, especially isolated artifacts and

locations, likely possess minimal research potential, while others, such as some features and sites, deserve further study, preservation, or both. All of these remains require more accurate identification as to their precise location, function, and present condition. Sources for locational data are listed in the site typology tables in chapter 5.

Plats contained in the Jean Hume Browning collection and maps in the Paul Spivey papers at the Bancroft Library will prove most useful in tracing out the logging operations on the ground. The problem of function can be partially addressed through analysis of photographs combined with data contained in this overview. The spatial and temporal organization of specific logging activities at particular locations, however, can only be reconstructed with the assistance of informants who are familiar with these sites. Many of the individuals consulted by Johnston and Spivey during their research on redwood logging in the same area have since died, and those with first-hand knowledge who are still alive are in their late seventies and eighties. The first stage in a sound management plan for these resources, therefore, is the design of an intensive survey of the entire historic redwood logging system, based on the primary documentary, cartographic, and pictorial sources identified in this report and the results of a systematic oral history program. The importance of the latter cannot be overstressed, as informants who directly participated in logging will be able to identify aspects of low level or "folk" technology which are not documented in any other source. Because most of the individuals that participated in these early lumbering operations are either deceased or are fairly old, this type of project should be undertaken as soon as possible. Such information can be gathered most effectively by employing three related techniques:

(1) Informants may be asked to draw their own site maps from memory, or maps may be drawn with the help of an illustrator; (2) informants can be shown photographs and asked to verbally reconstruct activities; or (3) these individuals may actually be taken to individual sites and interviewed there.

If a survey of the entire system cannot be performed, whether through the employment of seasonal staff or outside procurement, those portions of the redwood logging operations likely to be impacted by specific timber sales or other land uses should be identified prior to the conduct of project-related surveys and the appropriate locational and functional data assembled. In this way, specific types of remains can be anticipated prior to their discovery in the field, and special efforts can be made to locate them and evaluate their eligibility to the National Register in light of the recommendations made in chapter 6 of this report.

As pointed out in chapter 6, much of the significance of the historic redwood logging remains lies in their location and distribution within the larger system. Thus, much of the research potential of these resources demands that the full range of locations, linear features, sites, and cultural landscapes be precisely identified, located, and documented. It should be pointed out that once this survey is completed, much of the significance for many of these logging-related remains will have been realized. Only when the inventory is accomplished, however, can a reliable assessment be made as to the uniqueness or representativeness of any given site, and only then can determinations be made regarding preservation or protection of a representative sample. Thus, the performance of an intensive survey and an oral history program as outlined above, and an application of the methods recommended in this report, is in the

long run the most cost-effective and efficient means of assessing the significance of the resources and the potential impacts of multiple use upon them. More importantly, completion of such a survey will greatly reduce the impacts of ad-hoc cultural resource protection measures on these other land uses.

Impacts of Multiple Use on Historic Redwood Logging Remains

Impacts of the Forest Service's multiple use program affects each category of remains differently. These impacts will become less pronounced as more information regarding these resources is obtained and an accurate inventory of such remains is compiled. Some sites will require no further documentation, while others will require further investigation and/or preservation. If the survey recommended above has been performed, then the potential impacts upon isolated artifacts and most locations will not be adverse, since their significance can be realized if they are recorded, and/or systematically collected. Certain locations, however, may demand additional archaeological testing to be certain that important subsurface archaeological materials are not present. According to the guidelines of the Advisory Council on Historic Preservation, "testing is completed when sufficient information has been gathered to make a determination of eligibility or a management decision" (Advisory Council 1980:16). The purpose of such testing is to determine the depth, extent, condition, and nature of the deposit. From these findings, it is possible to determine if further investigation is warranted.

As has been mentioned, many of the most severe impacts to logging-related material remains occurred during the salvage of machinery and

equipment undertaken after the Sanger Lumber Company ceased its operations in the 1920s. Further damage was done by the Forest Service in its cleanup and restoration activities after acquisition of the Humes' landholdings. More recent impacts stem mainly from the construction and maintenance of roads required for fire protection and access to timber.

Of the various categories of logging-related material remains defined in the site typology, it is certain kinds of linear features which have been and will continue to be most affected by road construction and maintenance. In the case of railroad grades, many have been used for access routes by the Forest Service. These features can offer important evidence of the civil-engineering principles and construction techniques employed by the companies involved in logging the redwood and other timber within the Hume Lake Ranger District (Edaburn 1980:3). Much of this information, as noted previously, is not recorded in company documents. Unless surviving portions of railroad grades within the project area are identified and recorded, alteration of them will result in the loss of important information. Railroad grades can, of course, be used for hiking and equestrian trails without the degree of impact which accompanies their modification for larger vehicle access. Any adaptive reuse of these features should be preceded by a field assessment of their integrity and recording of construction details if warranted. Again, the mapping of existing railroad grades as part of the comprehensive survey recommended above would eliminate the need to treat them on a project-by-project basis. This latter approach can result in project delays and additional expense unless the Forest has the staff expertise available for such field assessment.

Impacts to the structural components of linear features, such as trestles and bridges, may also result from road-improvement and new construction programs. These structures may also have engineering features that cannot be assessed from documentary sources alone. Before trestles or bridges are demolished or replaced, they should be examined and their engineering features precisely characterized through measured drawings and photographs. Evaluation and recording of those structural features associated with historic logging will be most efficiently accomplished as part of the survey of the system as a whole.

The potential for impacts to logging-related sites is also great. This is especially true of the field camps and flume stations which are located in wooded areas likely to be harvested in the future. As many of these sites contain subsurface materials, they should be protected from logging or other ground disturbing activities until test excavations have been conducted to determine the nature and extent of buried deposits in or adjacent to them, and the value of these materials for addressing questions posed in the research design has been assessed. Other important sites, such as the former mill towns of Millwood and Hume are situated in areas where excellent opportunities for public recreation exist. As such, they are in danger from both the Forest's own recreation development program and from vandalism. These sites also need to be tested in order to ascertain the nature of their subsurface deposits, and, if warranted, protective measures should be taken. Testing of these two major sites should not be conducted until the documentary and oral history research necessary to correlate subsurface remains with specific activities or resident households has been completed.

Most of the areas defined in this report as cultural landscapes are

also within easy access by the public but do not appear to be in any real danger of vandalism. The greatest threat appears to be from natural forces such as erosion and from the Forest's own landscape assessment and management program. To the extent that the latter evaluates the visual qualities of landscapes in the project area without consideration for their historic character, the conservation practices which result may adversely effect their significant cultural attributes. These areas should be preserved and interpretive devices installed to convey to the public the activities that once occurred within this District.

Data Recovery and Interpretive Program

Isolated artifacts

As previously noted, isolated artifacts have little interpretive value once their association within the system has been disturbed. They are, however, significant representatives of an abandoned technology, and an attempt should be made to collect, preserve, curate, and house these artifacts in areas accessible for future study and to the general public. For example, they could be housed at the Sanger Historical Society in the town of Sanger, or in local museums. Most of the research potential of isolated artifacts will be realized once their locations have been mapped and they are properly curated. If the artifacts are in relatively good condition, they do have potential significance as interpretive objects for the public's appreciation and understanding of the region's history.

Locations

Locations can be treated similarly to artifacts. Most locations

once they have been identified and documented, offer little technological data in and of themselves. Documentation of these areas should consist of detailed recording, mapping, description, and photographing. In addition, during field reconnaissances of the logging system, preliminary testing with a trowel, probe, or auger, should be carried out adjacent to these locations to determine the extent or depth of any associated cultural materials. For example, many steam donkey locations are recognizable by the distinctive fan pattern created by the cables used to snake the logs during yarding activities (Rock 1980:10). This pattern should be documented, photographed, and tested to determine any significant cultural material associations. Usually, excavation at locations will be unnecessary. While their interpretive value may be high, locations are usually inaccessible to the general public.

Linear features

All linear features within the District have locational significance, and some have inherent technological significance. The mapping, documenting, and photographing each linear feature, therefore, is essential. Once this has been accomplished, many features, such as skidways, skidroads, or pole-chutes, will have realized their research potential. Most of these features, however, do possess considerable interpretive value, and samples of each type of linear feature should be preserved, preferable in areas where the public has easy access and can therefore appreciate them to their full potential. An excellent example of linear features with high public interpretive value and easy access is the skidway which is located in present-day Indian Basin (figure 9a), and the pole-chute in Converse Basin (figure 9b). Both of these features should

be protected, preserved, and interpreted to the public.

Many railroad grades exist throughout the district, and a representative sample should be protected from contemporary use as access roads. As noted above, these grades may have essential technological data inherent and may also serve as excellent interpretive devices. Apparently, no sections of the flume still survive; however, if any sections of this linear feature are located in future field surveys of this district, they should be preserved and protected in order that their technological and interpretive potential can be assessed.

Recently, sections of the wooden tramway which was constructed south of the Millwood mill were located by John Moore of the Hume Lake Ranger District. A determination of this feature's integrity should be made as soon as possible and, if warranted, protected, preserved, and interpreted in place. Adding an interpretive standard/plaque may help in lessening the possibility of vandalism. Again, the ideal is to preserve in place a representative sample of the linear features which were once an essential component of the redwood logging industry.

Sites

Several sites, such as mill towns, mill sites, flume herder stations, and field camps, within this District offer further interpretive potential as well as research potential. Again, all sites relating to this industry within the Hume Lake Ranger District should be located, recorded, and appropriately documented. Examples of sites with excellent interpretive potential are: Hoist Ridge, Millwood, and Hume. The remains at Hoist Ridge appear to have retained considerable integrity (figure 10a) and are situated near the railroad hoist line that extended to the Upper Abbott Mill (Camp 3) to the south, and to the Converse Basin mill to the

north. An old railroad grade branches off here and extends to the location of Camp 6 (figure 10b). This area is easily reached and provides an excellent opportunity to offer interpretations of historic redwood logging to the public. This site also warrants further testing to determine whether subsurface archaeological deposits are associated. Since subsurface testing destroys portions of the site, this testing program should be kept to a minimum and terminated as soon as eligibility determinations to the National Register and/or management decisions can be made (Advisory Council 1980:16). In addition, the extant wall of this site should be measured, recorded, drawn, and strengthened if possible.

The sites of Hume and Millwood are also areas where the potential for interpretation of historic logging is high. In relating information of this industry to the public, the uniqueness of the redwood logging operations can be fully appreciated. Without the incorporation of an interpretive program in this District, much of the significance of these sites is lost, as they do not convey this information in and of themselves.

Other sites, such as flume herder stations and field camps, should also be mapped, documented, photographed, and tested to see if any subsurface archaeological deposits are present. Determinations as to their further research and interpretive potential can then be made and further recommendations can be offered.

The dam located at Hume Lake is a site with very high interpretive value, as well as a site which is highly significant in addressing questions posed concerning technological levels and change. A periodic assessment as to its condition should be made, and repair work should be incorporated as needed. In addition, this dam should be nominated to the National Register by a professional architectural historian in order

that the dam's significance can be adequately addressed.

Landscapes

The greatest significance of cultural landscapes is their potential to portray to the contemporary population the effects of past actions and attitudes. Every effort should be made to protect these areas from unneccessary vandalism and erosion, as the full significance of these landscapes is realized when they can be appreciated by the public as relict cultural landscapes and as to the responses they elicit from the present-day population. These cultural landscapes should be considered as monuments which can remind us of something important. As Jackson pointed out:

> A monument can be nothing more that a rough stone, a fragment of ruined wall...or a tree ....it is venerated not as a work of art or an antique, but as an echo from the remote past suddenly become present and actual.... The monument, in short, is a guide to the future: just as it confers a kind of immortality on the dead, it determines our actions in the years to come (1980:91-93).

Impacts of Resource Protection Measures on Multiple Uses

It should be apparent that the long-range impacts of the protection measures recommended here upon various Forest land uses will be significantly reduced if the entire historic logging system is surveyed and recorded as part of one coordinated study. Should budgetary and personnel constraints make such a comprehensive survey and historical research program impossible, impacts in the form of project delays may result from the need to identify and assess logging-related resources on a piecemeal basis. Other measures, however, can be taken to reduce the likelihood of such delays. At the very least, aerial photographs can be combined with

the plats and maps identified in this overview to create an overall map of the historic logging system which shows the location of surviving railroad grades, skidtrails, skidways, pole-chutes, and sites. This map may be compared with existing and projected land-use plans to target those portions of the logging system which are likely to be affected by timber harvesting, recreational development, and other activities. Priorities for survey and historical research may thus be established. Such a map would be especially helpful in defining the boundaries of timber sales, preparing contract stipulations for these sales, and compiling appropriate background data, should survey prove necessary. Land-use planning for recreational and other purposes can also employ the information contained on these maps, as well as locational and other data presented in this overview.

In addition to these measures, Forest Service personnel charged with cultural resource management responsibilities in the Hume Lake Ranger District, whether permanent, part-time, or seasonal, should become familiar with the tools, equipment, machinery, and features associated with redwood logging and the respective periods of this use in the project area. Such training would greatly reduce the unwarranted caution which has characterized many decisions regarding the appropriate treatment of logging-related remains. If outside procurement is necessary to accomplish project-related surveys, efforts should be made to insure that those individuals or firms contracted to perform such work in areas where logging-related materials likely exist utilize staff capable of identifying, evaluating, and properly recording these remains.

It should be noted that although the occurrence and potential significance of most types of historic redwood logging materials can be

anticipated prior to their discovery in the field, the location of isolated artifacts cannot be predicted with any certainty. These objects are no longer in direct association with the areas of their original use. Familiarity with these materials in terms of identification and dating will, however, permit their timely evaluation regardless of where they are found.

Long-term maintenance and interpretation of redwood logging sites, features, and landscapes will certainly effect many aspects of the Forest's multiple land-use program. Avoidance of the most significant (i.e., representative) of these historic resources will require flexibility in the design and implementation of construction, and timber harvesting projects. Actual maintenance or preservation and, in cases where it is feasible, interpretive programs on selected sites and features will clearly involve expenditures in terms of both material and personnel. The cost of maintenance and preservation must be weighed against the recreational and educational benefits to be derived from telling the story of the *Sequoiadendron giganteum*'s destruction at the hands of a late nineteenth century human and machine-powered technology -- a story which can only really be told within the Hume Lake Ranger District.

An Ideal Management Strategy

The preceding management recommendations have been restricted to the program currently being developed by the Sequoia National Forest for its Hume Lake Ranger District. A more effective, long-range management approach would involve placing the identification, evaluation, and protection of historic redwood logging remains firmly within the context of California's State Historic Preservation Plan, the three

levels of the National Forest Service planning process (Forest, regional, and national), and the planning activities of other Federal and State agencies. The strategy proposed here is borrowed, in part, from the cultural resource planning process developed by the Division of State Plans and Grants of the now defunct Heritage Conservation and Recreation Service (HCRS 1980) for implementation at the State level. This planning process is based on the recognition that

> Historic preservation planning should broaden the social and technical context in which decisions are made and keep conflicts to a minimum. Preservation planning should transform technical data into management information. It should enable land-use managers who are not archaeologists, historians, or architects to make effective decisions by providing them with information that is relevant, timely, reliable, and easy to use. To achieve these results, *the identification, evaluation, and protection of historic, archaeological, and architectural properties must be integrated through a State-based network that allows reliable decisions to be made in relation to a body of general knowledge about similar properties,* in other words, comprehensive historic preservation planning (HCRS 1980:3-4).

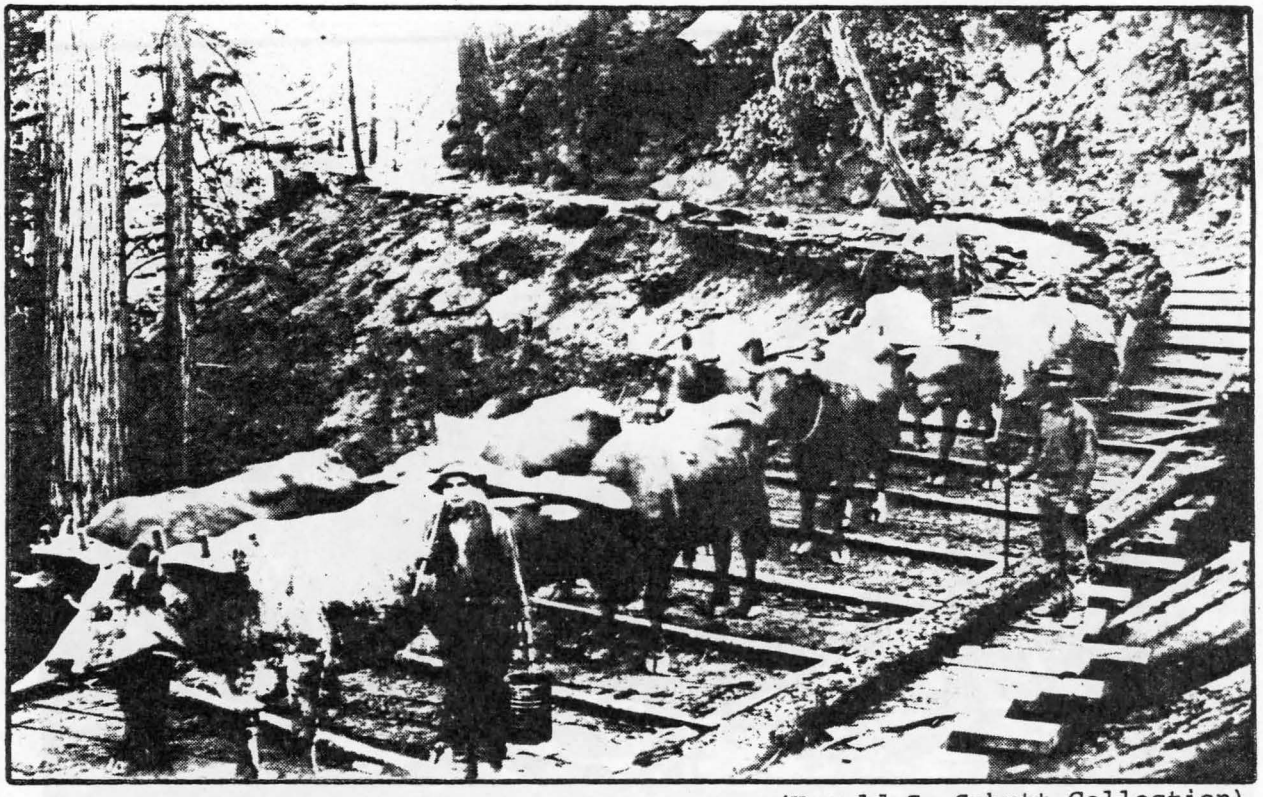
Clearly, historic logging activities produced a broad range of physical remains which now survive in varying states of preservation on National Forest land in California, on other Federal and State-controlled lands, and on private property. Decisions about which of these remains are eligible to the National Register of Historic Places and which should be protected and preserved should be made on the basis of an understanding of the whole of historic logging in California, rather than on the basis of the requirements of contemporary political subdivisions (i.e., National Forests, Bureau of Land Management Planning Districts, or counties).

It is proposed, then, that historic logging be defined as a major theme or "study unit" of the California State Historic Preservation Plan, made up of a set of related concepts which include the technological system of the late nineteenth and early twentieth century lumber industry, its labor force, organization of production, product distribution, and the supporting social, economic, and political structure of the communities dependent upon this industry (HCRS 1980:7). As has been shown in this overview, these concepts are expressed in tangible form in various types of linear features (skidways, pole-chutes, railroad grades), sites (mill sites, mill towns, field camps), and historic landscapes (clear-cut valleys, remnant stands of old-growth). The overall spatial distribution of historic logging in the state can be mapped from existing data, and -- depending on local conditions -- its temporal span can be defined. Once historic logging is defined in these terms, the existing data base can be evaluated and a set of general research and preservation priorities can be established. Particular historic logging systems which appear to exemplify major phases in the technological, economic, and social history of this industry within California can be identified, and special efforts can be made to study and preserve significant remains associated with them.

In the absence of guidance from the California Office of Historic Preservation, one means of achieving this kind of essential background knowledge of historic logging in California, as well as a coordinated planning and management approach to these resources, is to integrate the results of specific studies of logging, such as this one, with the more comprehensive cultural resource overviews now being conducted for National Forests and Bureau of Land Management Planning Districts in the

state. Certainly the results of this overview can be placed in the broader context of historic logging in the southern Sierras by incorporating the data and recommendations it contains into the overview to be prepared during the next several months for the Sierra National Forest, Sequoia National Forest, and the Bakersfield District of the Bureau of Land Management (RFP R5-SCZ-81-01). Similar data on historic logging contained in these other interagency cooperative overviews may also be combined and analyzed to produce research and preservation priorities for historic logging remains on National Forest and Bureau of Land Management lands in California. Only through such coordinated efforts can the real significance of these resources be defined and appropriate protective or preservation measures be established.

FIGURE 1



(Harold G. Schutt Collection)

a: Transporting logs by oxen; note skidgreaser with broom

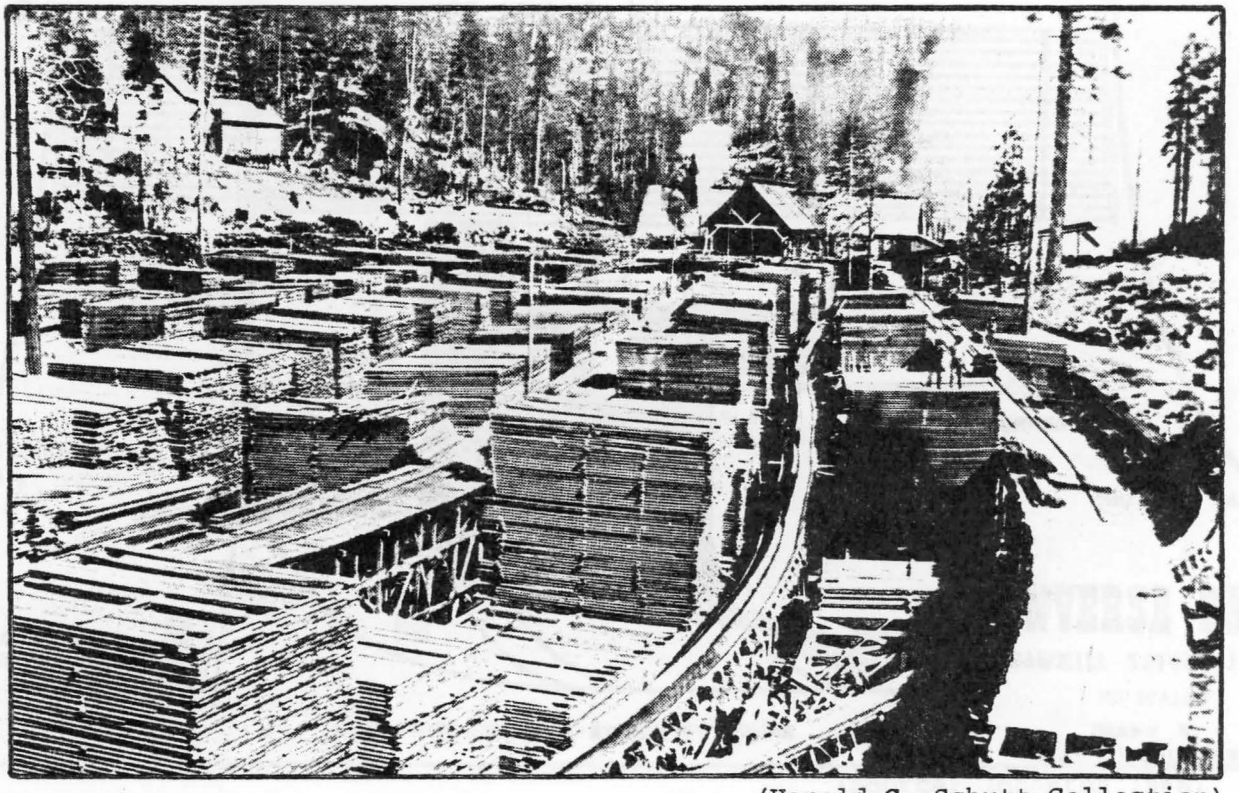
(Harold G. Schutt Collection)

b: Bucking a redwood; note equipment - saws, axes, augers, peelers, grease

FIGURE 2

(Harold G. Schutt Collection)

a: Hitchcock Mill (Pre S. Comstock); above Happy Gap



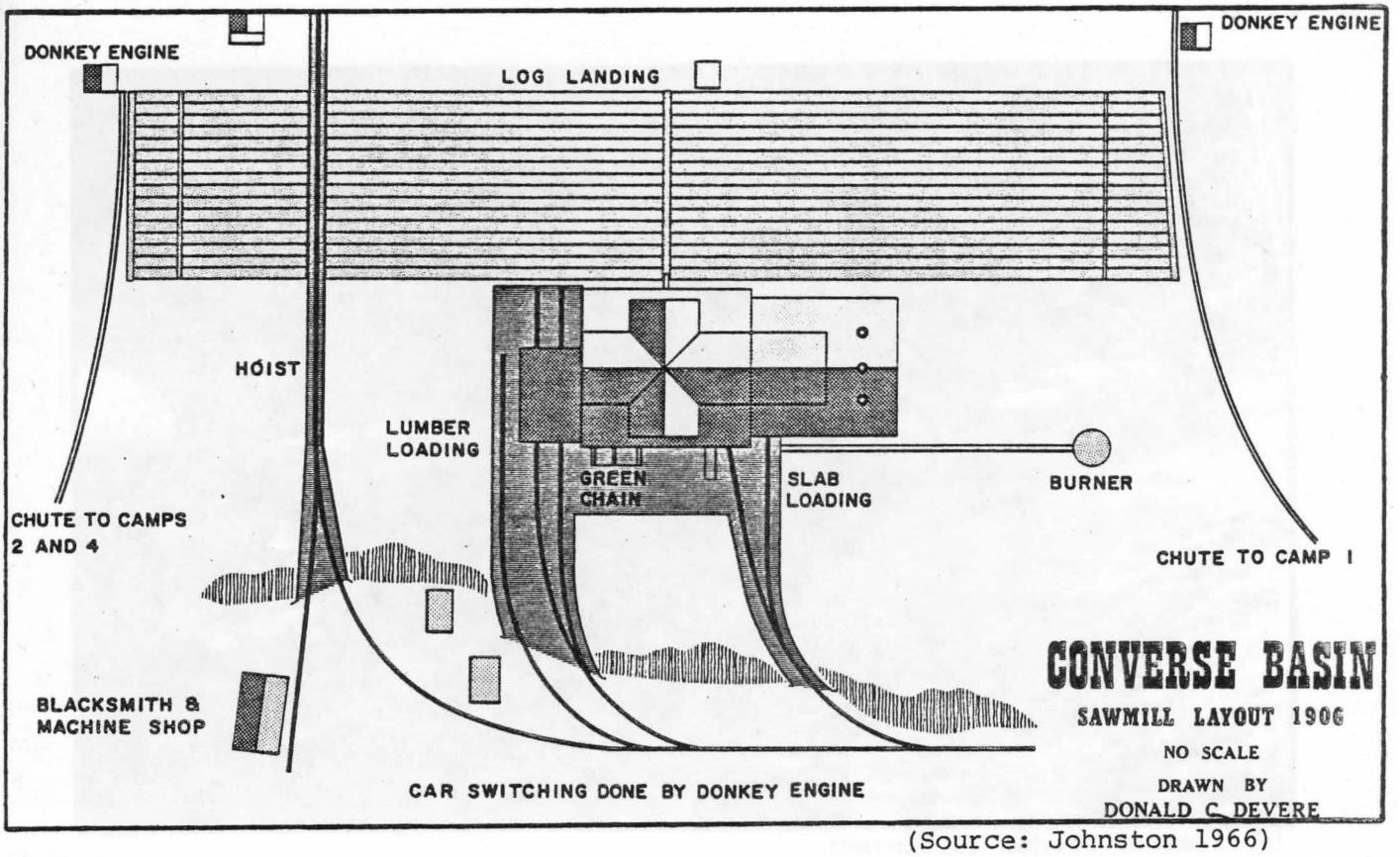
(Harold G. Schutt Collection)

b: Mill at Millwood (aka Sequoia Mill)

FIGURE 3

(Harold G. Schutt Collection)

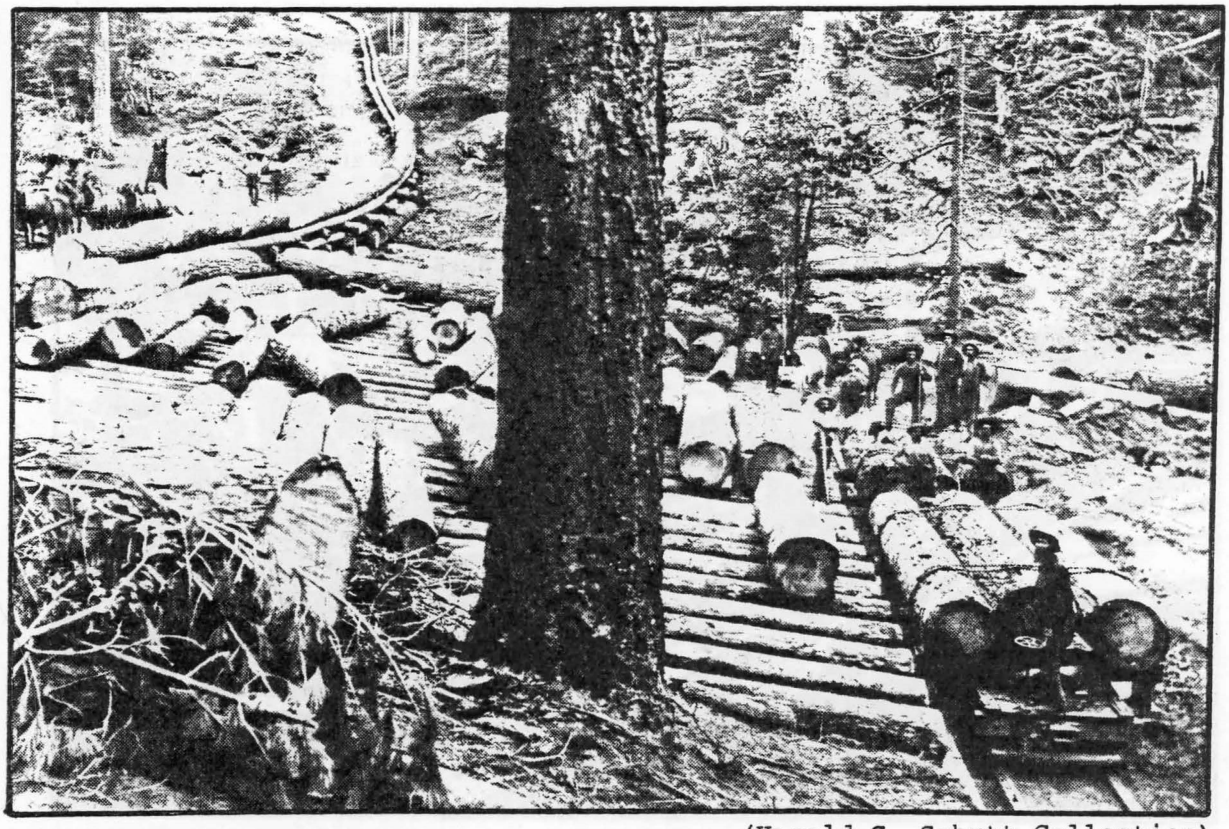
a: Converse Basin Sawmill



(Source: Johnston 1966)

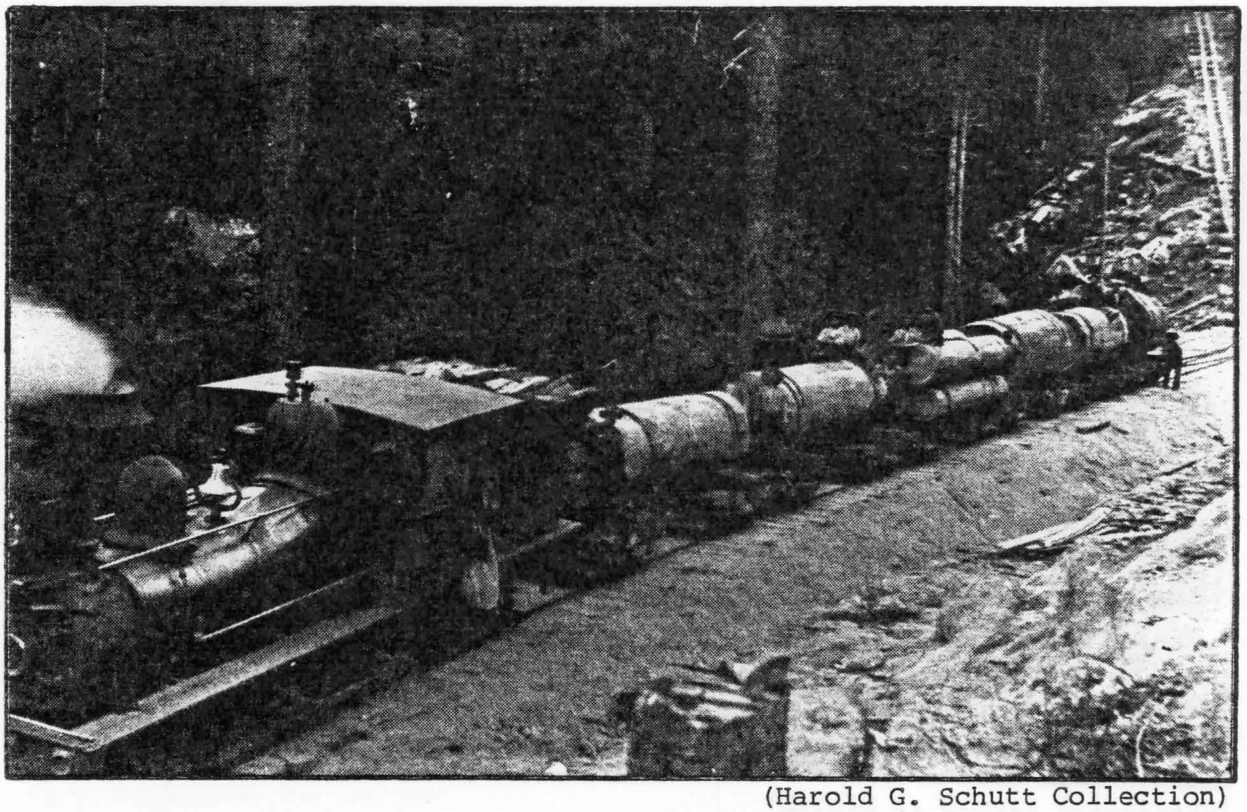
b: Layout of Converse Basin Sawmill in 1906; drawn by Donald C. DeVere

FIGURE 4



(Harold G. Schutt Collection)

a: Horse tramway from "Sequoia Mill" down to Sequoia Lake



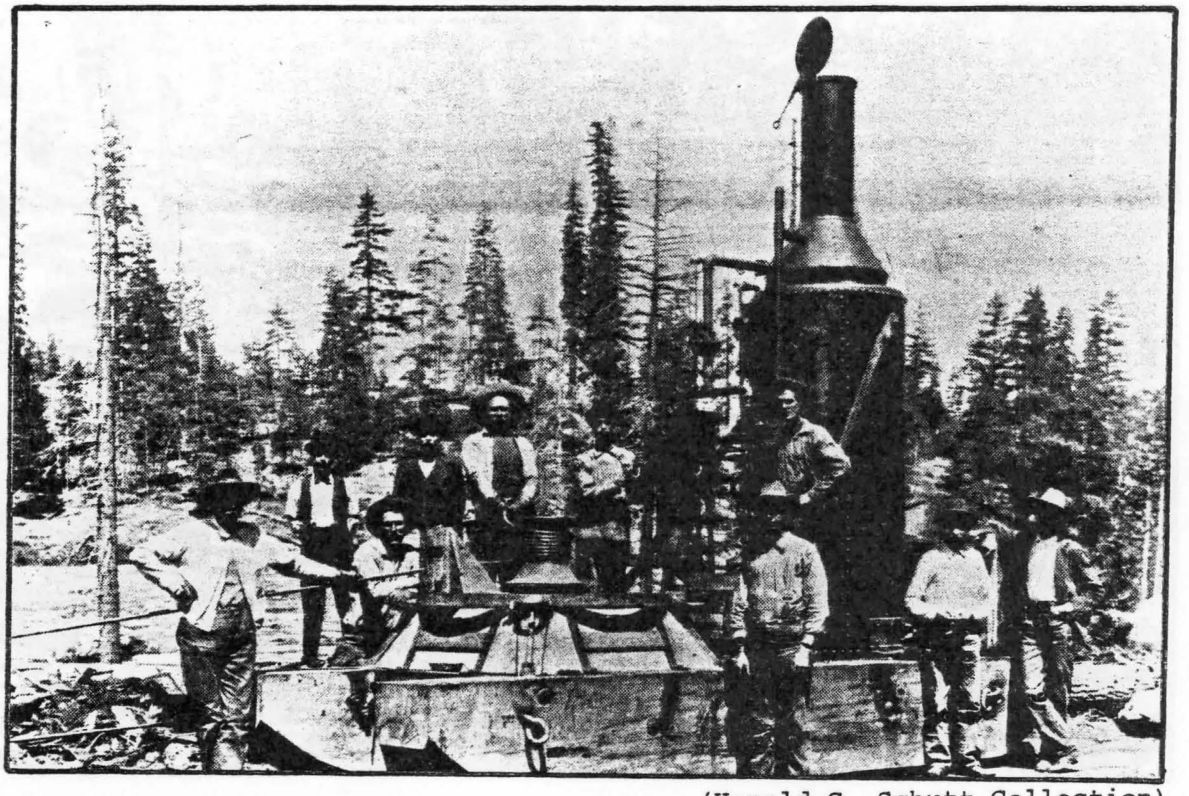
(Harold G. Schutt Collection)

b: Shay locomotive between Millwood and Converse Basin; note chute upper right

FIGURE 5

(Harold G. Schutt Collection)

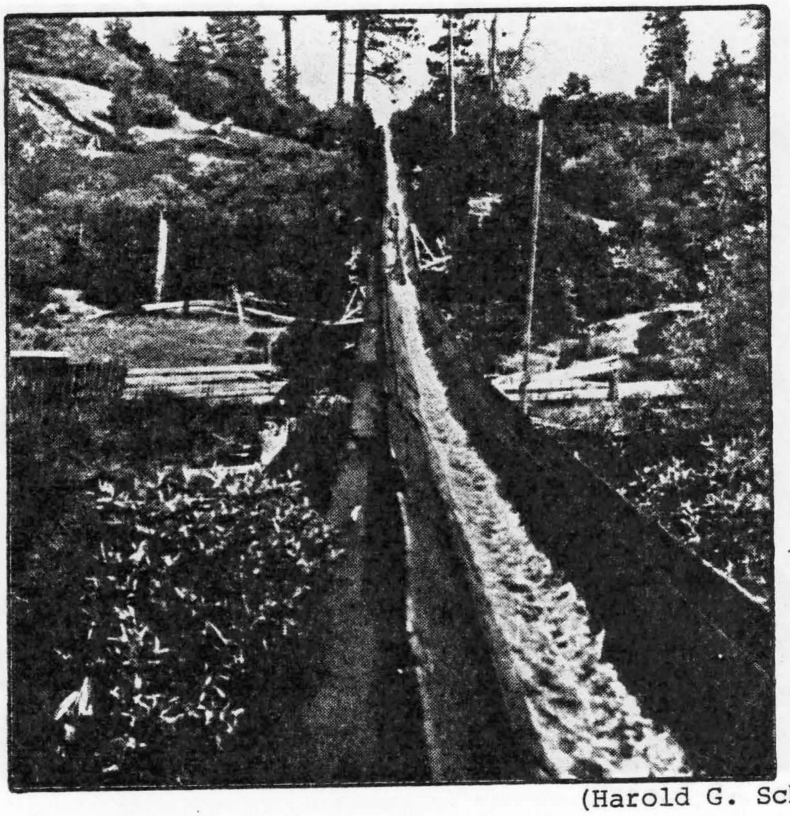
a: Dolbeer donkey crew near Camp 1, Millwood



(Harold G. Schutt Collection)

b: Dolbeer donkey crew

FIGURE 6



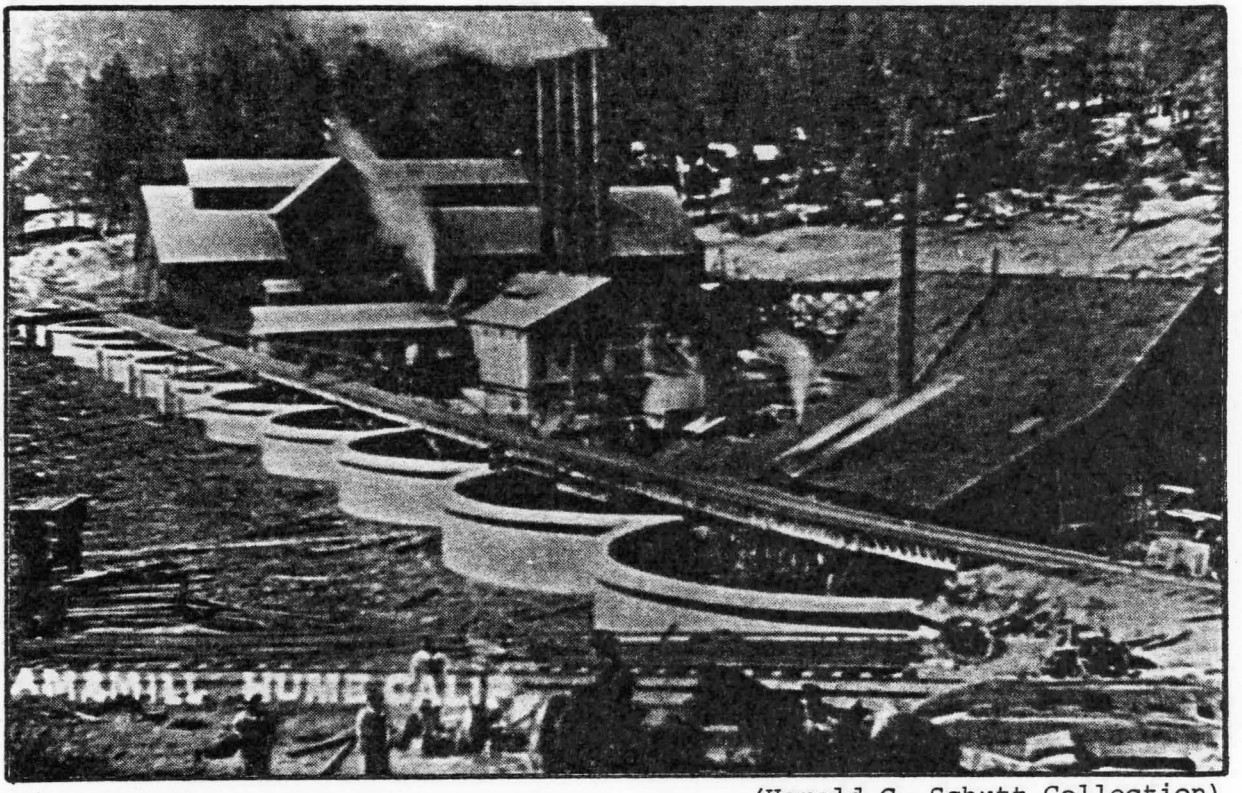
(Harold G. Schutt Collection)

a: Steep section of flume, near Millwood

(Harold G. Schutt Collection)

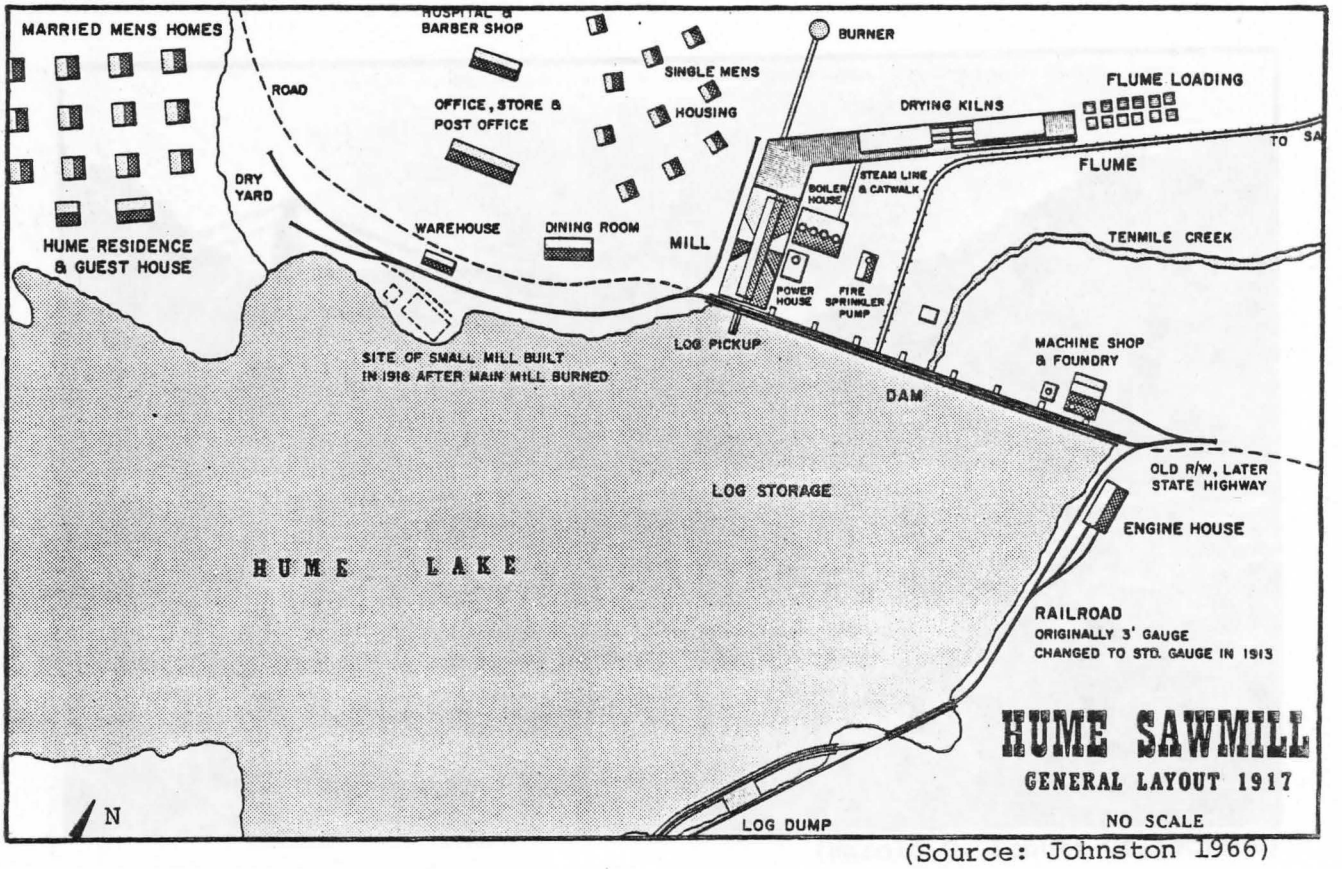
b: Chuteway in Converse Basin; note Dolbeer donkey in center left

FIGURE 7



(Harold G. Schutt Collection)

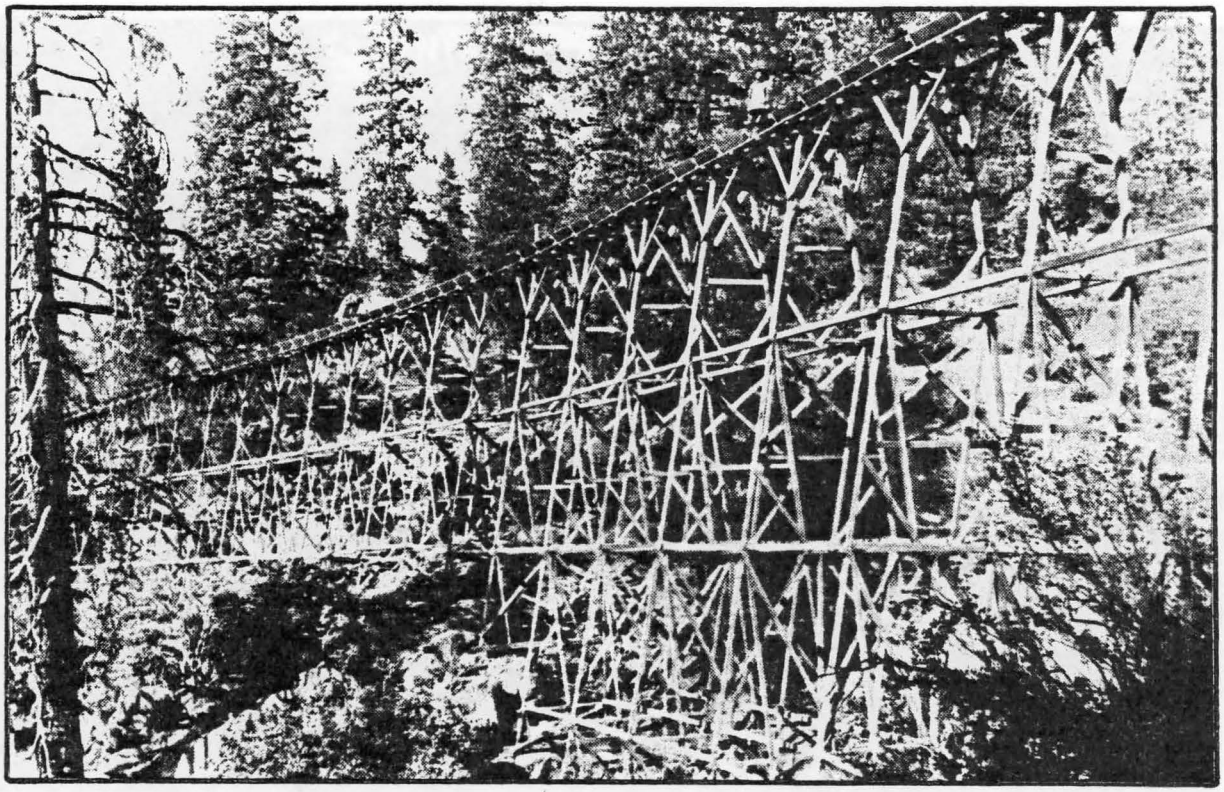
a: Sawmill and Dam at Hume



(Source: Johnston 1966)

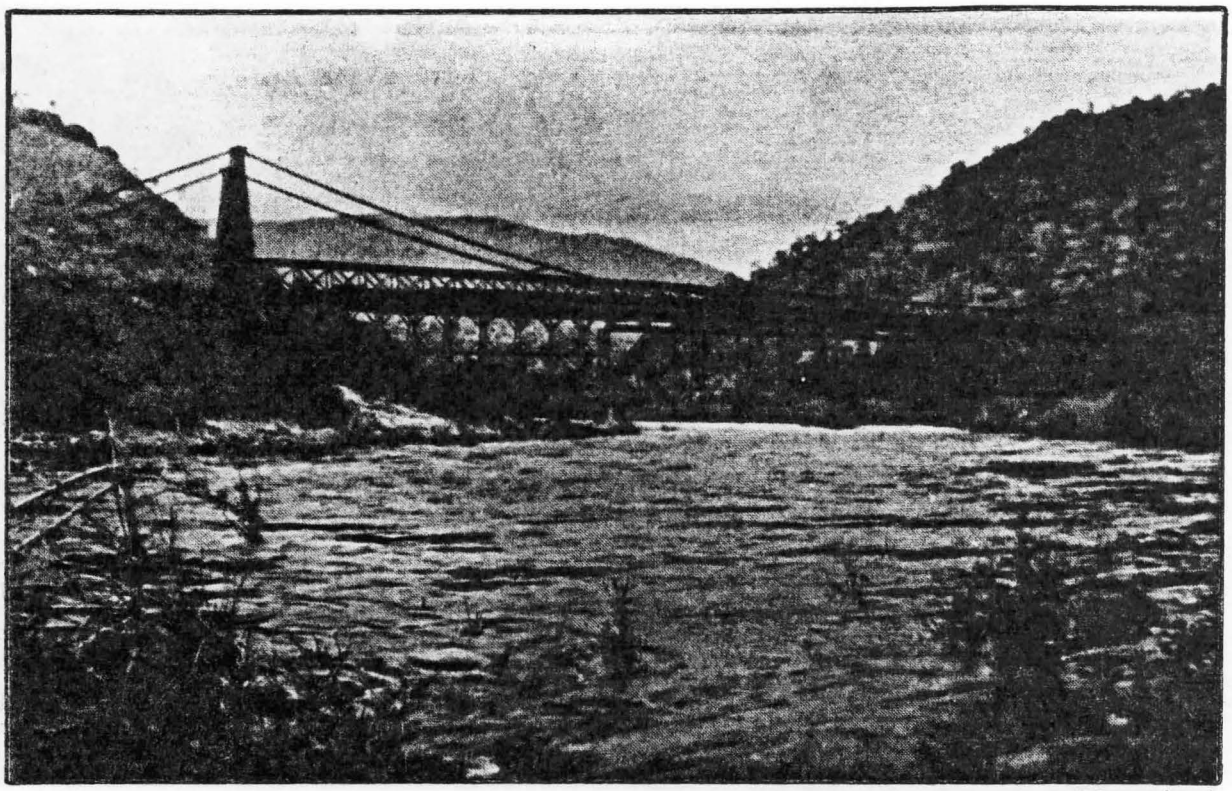
b: Layout of Hume Mill and associated buildings; drawn by Donald C. DeVere

FIGURE 8



(Harold G. Schutt Collection)

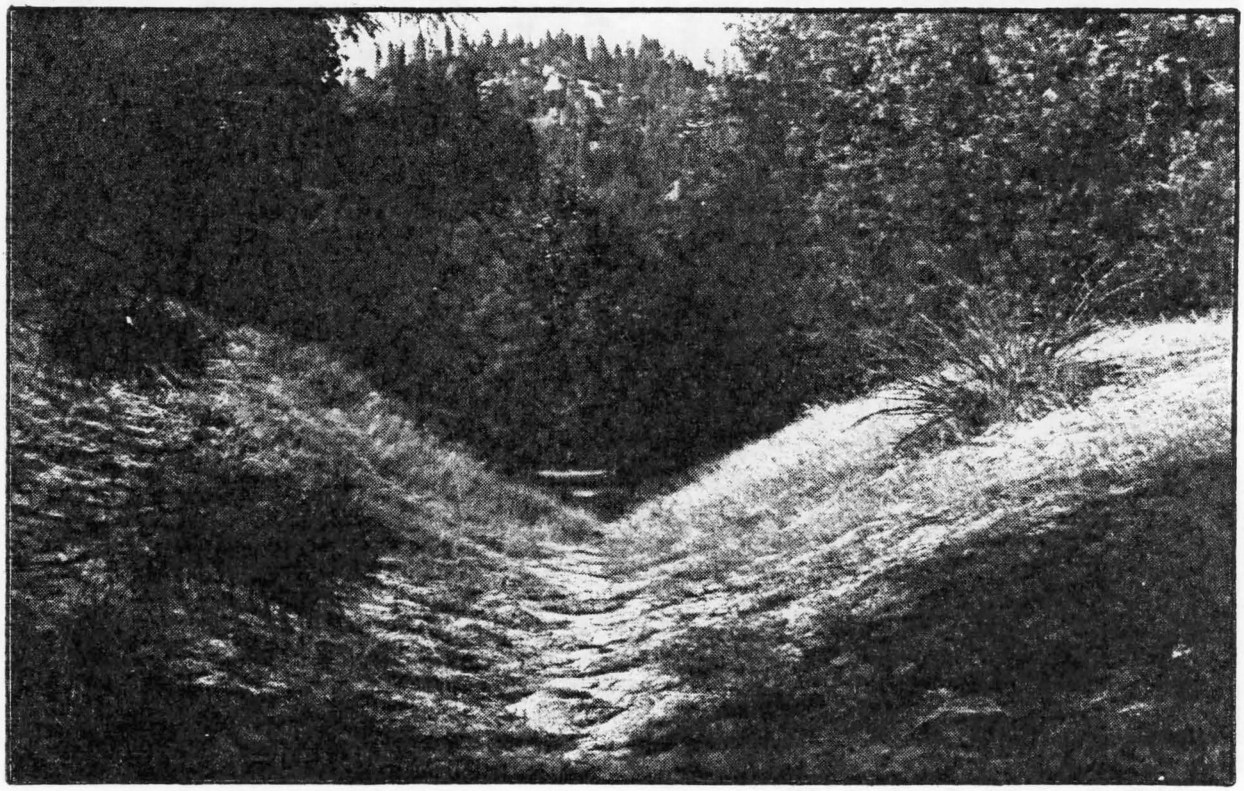
a: Flume and trestle; note man standing on running board



(Harold G. Schutt Collection)

b: Flume bridge over Kings River, near Trimmer Springs

FIGURE 9



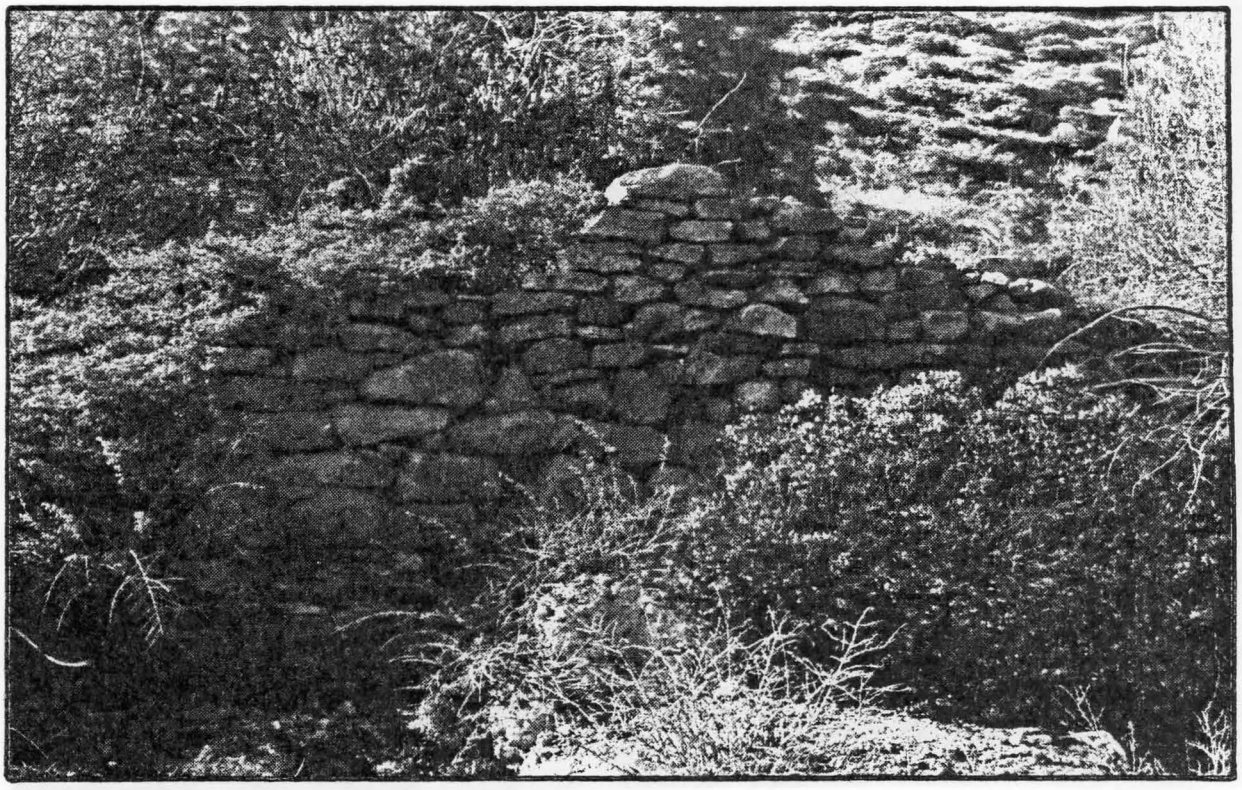
(Photo by C. Michael Elling)

a: Present day skid-way through Indian Basin

(Photo by C. Michael Elling)

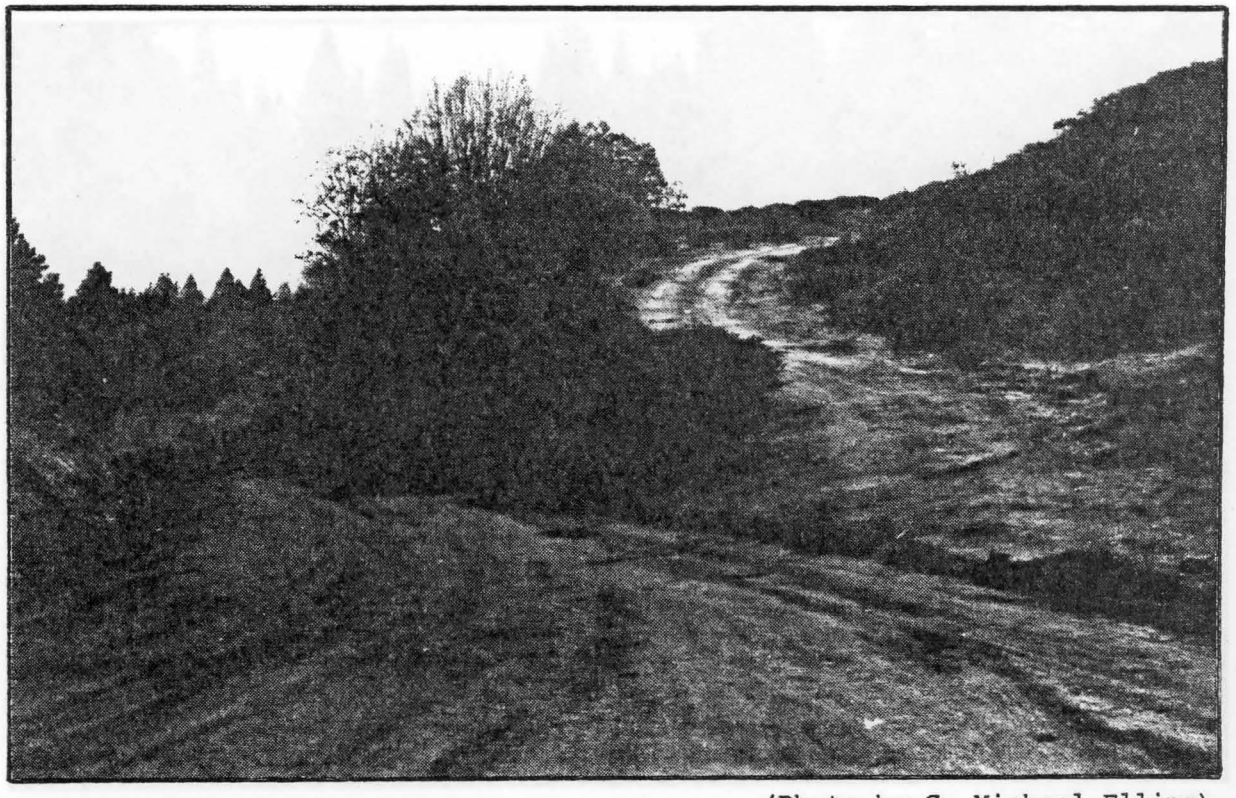
b: Present day remnant of chute in Converse Basin

FIGURE 10



(Photo by C. Michael Elling)

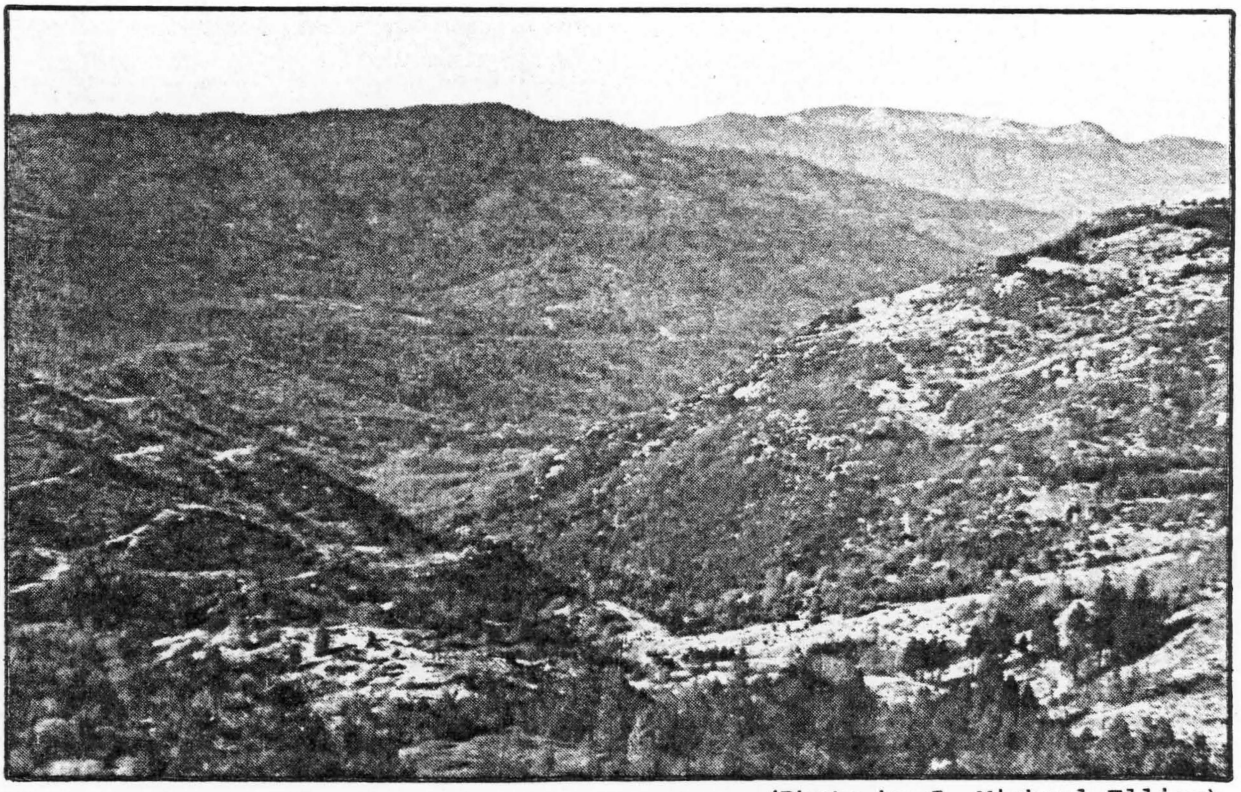
a: Old wall of Hoist on Hoist Ridge



(Photo by C. Michael Elling)

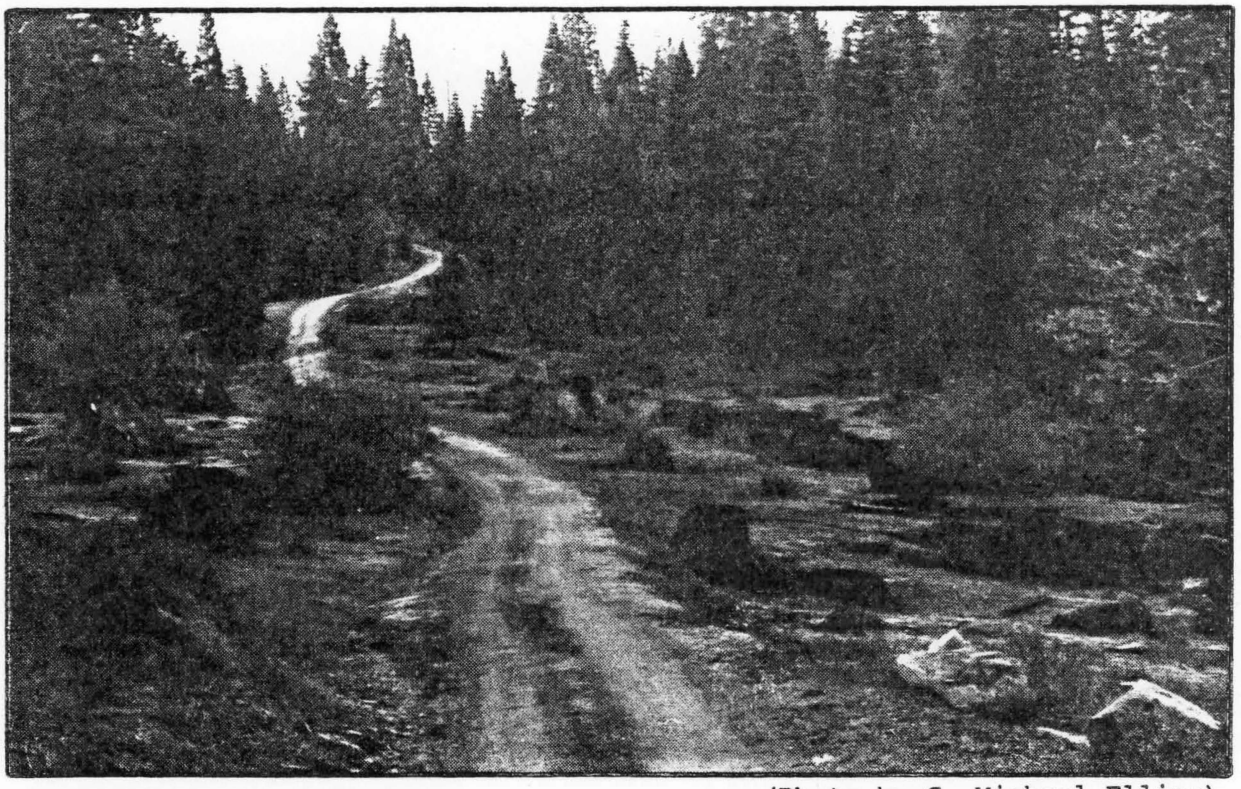
b: Old railroad grades. Left - goes down to Upper Abbott Mill
Right - goes up to Camp 6

FIGURE 11



(Photo by C. Michael Elling)

a: Location of Upper Abbott Mill; lower center of photo



(Photo by C. Michael Elling)

b: Stump Meadow today in Converse Basin

APPENDICES

APPENDIX A

LAND PLATS AND MAPS IN THE HACKLEY-HUME PAPERS

Rand McNally map of California with Hume, California shown

Photocopy of Map of Hume Lake District, Sequoia National Forest, California Region, 1952

Map showing proposed routing of State highway through Sanger Lumber Company lands

Map of Tulare lake bed

Map showing right of way of railroad through Hume, California

Map of Hume-Bennett Tract in Tulare County

Geographical survey of Tulare County

Sketch of Tulare County showing ownership of lands

Two blueprints of Hume Mill at Hume, California

Blueprint of Boiler House and Engine House at Hume, California

Street map of Fresno, California

Two plat sections in Fresno, California

Twenty-one plats of several sections in Tulare County

U.S. Geologic survey of area of Hume lands in California with accompanying report

APPENDIX B

LAND PLATS AND MAPS IN THE PAUL SPIVEY COLLECTION

Proposed railroad and timber cruise: T13S, R29E, Sec 17-18, 19-20 (near Hume, CA). 25 x 35 cm. Scale 1:15,840.

Proposed railroad and timber cruise: T13S, R28-29E, near Hume. 25 x 39 cm. Scale 1:15,840.

Proposed Boulder Creek railroad and timber cruise, near Hume (photocopy, blueprint of ms. original, including tables and cost figures). 36 x 50 cm. Scale 1:15,840.

Map showing tentative route of applied for railroad right-of-way; across U.S. Government land in T13S, R29E. 46 x 62 cm. Scale 1:24,000.

Railroad preliminaries ran in October 1922 (Hume region, CA). 48 x 45 cm. Scale 1:13,680.

Camp 6 in 1906, Hume region (notes on lumber camp personnel. 28 x 44 cm. Not to scale.

Plat showing land logged to Hume: Hume-Bennett Lumber Co. (includes table showing company and government acres logged 1908-1918 in parts of T13S, R28-29E). 52 x 61 cm. Scale 1:31,680

1919 timber cruise. 60 x 82 cm. Scale 1:15,840.

Map of Sequoia Lake. 61 x 42 cm. Scale 1:4,800.

Additional Maps:

Insurance company map of Sanger (1897).

Map of Sanger, California in Official Historical Atlas of Fresno County by T.H. Thompson.

APPENDIX C

GUIDE TO HACKLEY-HUME PAPERS

California Lands

Box 21

Folder	Description	Date
1-28	Hume-Bennett Lumber Co. & Sanger Lumber Co. State and Federal Income Taxes	1910-1937
29	Sanger Lumber Co., Cal. Old Corporate Papers	1896-1905
30	Hume-Bennett Lumber Co., Cal. Abstracts of Title Lines, Articles of Assoc., Agreement to buy Sanger Property	1905
31	Hume-Bennett Lumber Co., Cal. Sanger Lumber Co. Timber on "Ten-Mile" (stream)	1905
32	Hume-Bennett Lumber Co., Cal. Stockholders Meeting	1905
33-34	Hume-Bennett Lumber Co., Cal. Sanger Lumber Co. Contracts	1905
35	Hume-Bennett Lumber Co., Cal. Sanger Lumber Co. Inventory	1905
36	Hume-Bennett Lumber Co., Cal. Sanger Lumber Co. Land Lists, further Inventory	1905
37	Hume-Bennett Lumber Co., Cal. Sanger Lumber Co. Inventory Adjustments & Machine Orders	1906
38	Hume-Bennett Lumber Co., Cal. Contacts, Correspondence, Insurance	1906
39	Hume-Bennett Lumber Co., Cal. Fresno Canal & Irrigation Co. Agreement	1906
40	Hume-Bennett Lumber Co., Cal. Michigan Trust Co. Deed of Trust	1907
41	Hume-Bennett Lumber Co., Cal. Michigan Trust Co. -Deed of Trust Board of Director's Meeting	1907
42	Hume-Bennett Lumber Co., Cal. Bond Issue	1907
43	Hume-Bennett Lumber Co., Cal. Capitol Stock Increase, Ira Bennett's protest, etc.	1907
44	Hume-Bennett Lumber Co., Cal. State of Cal. Contract	1907
45	Hume-Bennett Lumber Co., Cal. Correspondence & Contracts	1907
46	Hume-Bennett Lumber Co., Cal. Wm. McKenzie contract	1907

California Lands (cont.)

Box 21 (cont.)

Folder	Description	Date
47-48	Hume Bennett Lumber Co., Cal. Correspondence, insurance timber estimates	1908
49	Hume-Bennett Lumber Co., Cal. Cal. Pine Box & Lumber Co.	1908
50	Hume-Bennett Lumber Co., Cal. Bennett contract with Hovey & Livingston	1909
51	Hume-Bennett Lumber Co., Cal. Correspondence	1909

Box 22

Folder	Description	Date
1-2	Hume-Bennett Lumber Co., Cal.	1909
3	Hume-Bennett Lumber Co., Cal. Cal. Pine Box & Lumber Co.	1909
4	Hume-Bennett Lumber Co., Cal. Inventory & description of property	1909
5	Hume-Bennett Lumber Co., Cal. Annual Net Income Report	1909
6	Hume-Bennett Lumber Co., Cal. Board of Water Commissioners Contract & other correspondence	1910
7	Hume-Bennett Lumber Co., Cal. Correspondence	1911
8	Hume-Bennett Lumber Co., Cal. Dam at Hume, Cal. Construction & Patent Dispute	1911
9	Hume-Bennett Lumber Co., Cal. Capital Stock Increase Plan	1911
10	Hume-Bennett Lumber Co., Cal. Purchase of Ira Bennett's Common Stock	1912
11	Hume-Bennett Lumber Co., Cal. Capital Stock Increase Plan	1912
12	Hume-Bennett Lumber Co., Cal. Board of Directors Meeting	1912
13	Hume-Bennett Lumber Co., Cal. Alosi vs. Hume-Bennett Lumber Co.	1912
14	Hume-Bennett Lumber Co., Cal. Protest dam against King's River	1912
15	Hume-Bennett Lumber Co., Cal. Contracts & Correspondence	1912-1914

California Lands (cont.)

Box 22 (cont.)

Folder	Description	Date
16	Hume-Bennett Lumber Co., Cal. Rights of Way Agreement	1912-1915
17	Hume-Bennett Lumber Co., Cal. Kenoyer vs. Hume-Bennett Lumber Co.	1913
18	Hume-Bennett Lumber Co., Cal. Vandenbark vs. Hume-Bennett Lumber Co.	1913
19	Hume-Bennett Lumber Co., Cal. Giravdo vs. Hume Bennett Lumber Co.	1914
20	Hume-Bennett Lumber Co., Cal. Change of Corporate Name	1913-1914
21	Hume-Bennett Lumber Co., Cal. Timber Exchange & Estimates Insurance Policies & Correspondence	1915-1916
22	Hume-Bennett Lumber Co., Cal. Proposed Pine Flat Storage Dam Newspaper Clippings	1916
23	Hume-Bennett Lumber Co., Cal. Change of Name: From Hume-Bennett to Sanger Lum ber Co.	1917
24-25	Sanger Lumber Co., Cal. Fire at Hume, Cal. Operation	1917-1919
26	Sanger Lumber Co. Tes timony Fire Loss Witnesses	1917
27-28	Sanger Lumber Co., Cal. Yack Yunger Extortion Case Newspaper Clippings	1918-1919
29	Sanger Lumber Co., Cal. Retirement of Bonds	1920
30	Sanger Lumber Co., Cal. Timber Estimates	1921
31	Sanger Lumber Co., Cal. Michigan Securities Commission	1923
32	Sanger Lumber Co., Cal. Land List, Fresno & Tulare Cos.	1923
33	Sanger Lumber Co., Cal. Michigan Trust Co. Mortage	1923-1930
34	Sanger Lumber Co., Cal. U.S. Forest Service/ Flume Fire Damage	1926
35-40	Sanger Lumber Co., Cal. Correspon dence	1926-1927
41	Sanger Lumber Co., Cal. Prescott Lumber Co. Contracts & Correspondence	1927-1928

California Lands (cont.)

Box 22 (cont.)

Folder	Description	Date
42	Hume Bros. Correspondence Cal., N. & S. Carolina Lands & General Business Matters	1928
43-46	Sanger Lumber Co., Cal. Correspondence	1928
47	Sanger Lumber Co., Cal. State Highway Right of Way	1928-1929
48	Sanger Lumber Co., Cal. Tax Receipts, Options, Court Judgement	1928-1930
49-52	Sanger Lumber Co., Cal. Correspondence	1929
53	Sanger Lumber Co., Cal. Prescott Lumber Co. Lease & Correspondence	1929
54	Sanger Lumber Co., Cal. Prescott Lumber Co. Contracts & Cuttings	1929
55	Sanger Lumber Co., Cal. Michigan Trust Co. Reconveyance of Trust Deed	1929
56	Sanger Lumber Co., Cal. State Highway Right of Way	1929
57-59	Sanger Lumber Co., Cal. Correspondence	1930
60	Sanger Lumber Co., Cal. Attorney's Correspondence	1930
61-62	Sanger Lumber Co., Cal. Correspondence	1930

Box 23

Folder	Description	Date
1	Prescott Lumber Co./Sanger Lumber Co., Correspondence	1931
2	Sanger Lumber Co. Newspaper Clippings, Proposed National Park	1931
3	Sanger Lumber Co. Attorney's Correspondence	1931
4	Sanger Lumber Co. Fire Damage Claim	1931

California Lands (cont.)

Boc 23 (cont.)

Folder	Description	Date
5	Sanger Lumber Co. Proposed Wm. Randolph Hearst Sale	1931-1932
6-8	Sanger Lumber Co. Correspondence	1932
9	Prescott Lumber Co. Correspondence	1932
10	Sanger Lumber Co. Attorney's Correspondence	1932
11	Carolina Timber Co. Cal. Lands Holding Company Papers	1921-1942
12-19	Sanger Lumber Co. Correspondence	1933-1935
20	Sanger Lumber Co. Sale Sanger Lands	1934-1935
21-22	Sanger Lumber Co. Correspondence	1936
23	Sanger Lumber Co. National Park Proposed Purchase	1936
24	Sanger Lumber Co. Orange Cove Lumber Co.	1936
25	Sanger Lumber Co. Real Estate Broker Correspondence	1936
26-36	Sanger Lumber Co. Correspondence (including Redwoods)	1936-1943
37	Tulare County, Cal. Lands Other Owners	N.D.
38-57	Tulare County Redwood Lands Correspondence & Contracts	1935-1947
58-63	Calaveras Bond Holders Protective Committee California Timber Lands	1928-1939

APPENDIX D

FOLDERS IN THE PAUL SPIVEY COLLECTION AT THE BANCROFT LIBRARY

Letters to Paul Spivey, A-Z

Spivey, Paul -- notes, Sawmills

Spivey, Paul -- notes, Converse Basin

Spivey, Paul -- notes, Flume Herder Camps

Spivey, Paul -- notes, addresses

Spivey, Paul -- notes, Misc.

Materials re: Hume Lake

Materials re: Tulare County, California

Materials re: Converse Basin

Materials re: Millwood, California

Materials re: Shay locomotives

Clippings -- Redwoods

Clippings -- Sawmills

Clippings -- Sawmills/Millwood

Clippings -- Donkey engines

Clippings -- Sierra Nevada

Clippings -- Forest Fires

Clippings -- Pat Hart articles

Clippings -- Misc.

Misc.

QUICK REFERENCE CHART ON SIMILARITIES AND CONTRASTS OF COAST REDWOODS AND SIERRA BIG TREES

	COAST REDWOOD *(Sequoia sempervirens)*	BIG TREE *(Sequoiadendron giganteum)*
CLIMATE	A great deal of rain (80-100 inches in areas of best development) but rarely any snow. Heavy summer fogs, moderate year-round temperatures.	Warm summers (up to 90°F) and cold winters (down to −10°F). Precipitation ranges from 20 to 60 inches, much of it snow.
AGE	Oldest authenticated age is 2,200 years. A few are more than 2,000, but the average age of mature trees is 500-700 years.	Oldest authenticated age of cut tree is 3,126 years. Oldest standing tree is thought to be 2,700 years old; a few others may be over 2,000 years.
SIZE	Tallest trees in the world. Tallest is over 365 feet; hundreds more are over 300 feet. Average diameter of mature trees is about 6 feet; a few reach 15 or 20 feet at chest level.	Largest trees in the world in terms of bulk. Tallest is 296 feet; average height of mature trees is 250-275 feet. Largest specimens have 15 to 30-foot diameters at chest level; a few have 40-foot diameters at ground level.
DISTRIBUTION	500-mile-long discontinuous belt near the coast, at elevations ranging from sea level to almost 3,000 feet. Best development in northern area; occurs in pure stands on flats and river benches.	250-mile range on west slope of Sierra Nevada at elevations from 8,800 feet down to 4,500 (and rarely to 2,900). Trees occur in definite groves, ranging in size from half a dozen to several thousand. Only 8 of 75 groves are north of the Kings River; best development is at the southern end of the range. Rarely found in pure stands.
DISCOVERY	1769, near Watsonville, by Portola expedition.	1833, near Yosemite Valley by Joseph Walker expedition.
BARK	Fibrous, stringy, but denser than that of Big Tree. Resin free. About 12 inches thick at maximum. Fluted.	Same texture as that of coast redwood, but softer and much redder in color. Usually about 8-15 inches thick, but may reach 2 feet on largest specimens. Deeply furrowed on larger trees.
FOLIAGE	Narrow needles in flat sprays on opposite sides of twig. Similar to white fir but sharp-pointed at end.	Sharp-pointed, short, awl-like scales completely encircling round branchlets. Somewhat similar to juvenile foliage of incense cedar and juniper.
CONES & SEEDS	Each cone about the size of a ripe olive; light brown. Matures in about 6 months. Seeds smaller and darker than those of Big Tree; about 50-60 in each cone.	Each cone about the size of a lime; bright green when mature, brown when dried. Matures in about 15 months. 150-250 seeds in each cone.
ROOTS	Broad and shallow; no tap root. May extend 80-100 feet from trunk and 4-6 feet in depth.	Similar to those of coast redwood, but may extend outward for 200-300 feet.
REPRODUCTION	Only known commercial conifer to reproduce extensively from stump sprouts. Also by seeds.	By seeds only.

(Anonymous 1971)

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*Sub-surface archaeological materials likely

Remains or Site Types	Related Tasks	General Activity	Known Examples/Location	Known Documentation
SITES (Cont)				
*mill town	shelter, subsistence, labor, entertainment, recreation	Labor/Subsistence/ Milling/Recreation/ Entertainment	Hume T13S, R28E, Sec 14	USFS site record 05-13-51-2 Johnston 1966 Spivey Collection
*Eastwood Dam (Hume Lake Dam)	storage, recreation	Milling/Recreation	Hume Lake T13S, R28E, Sec 14	USFS site record 051-3-51-2 Johnston 1966 Spivey Collection
LANDSCAPES				
stumps	felling	Logging	area of field camps and mills	
complex of linear features such as: roads, skidways skidroads, chutes, railroad hoists, and railroad grades	construction, transport	Construction/Hauling/ Skidding	Historic Redwood Logging System	USFS aerial photographs; black and white (1940s) Johnston 1966 (map
Hume Lake	storage, recreation	Milling/Recreation	Hume Lake T13S, R28E, Sec 14, 15	Johnston 1966 Spivey Collection